Kafka: Build, Deploy, & Monitor Your First Real-world Application

THE BASICS: TOPICS, PRODUCERS, & CONSUMERS

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Course Overview

Kafka Basics

Configuration

Customization & Production Readiness

DevOps: Monitoring

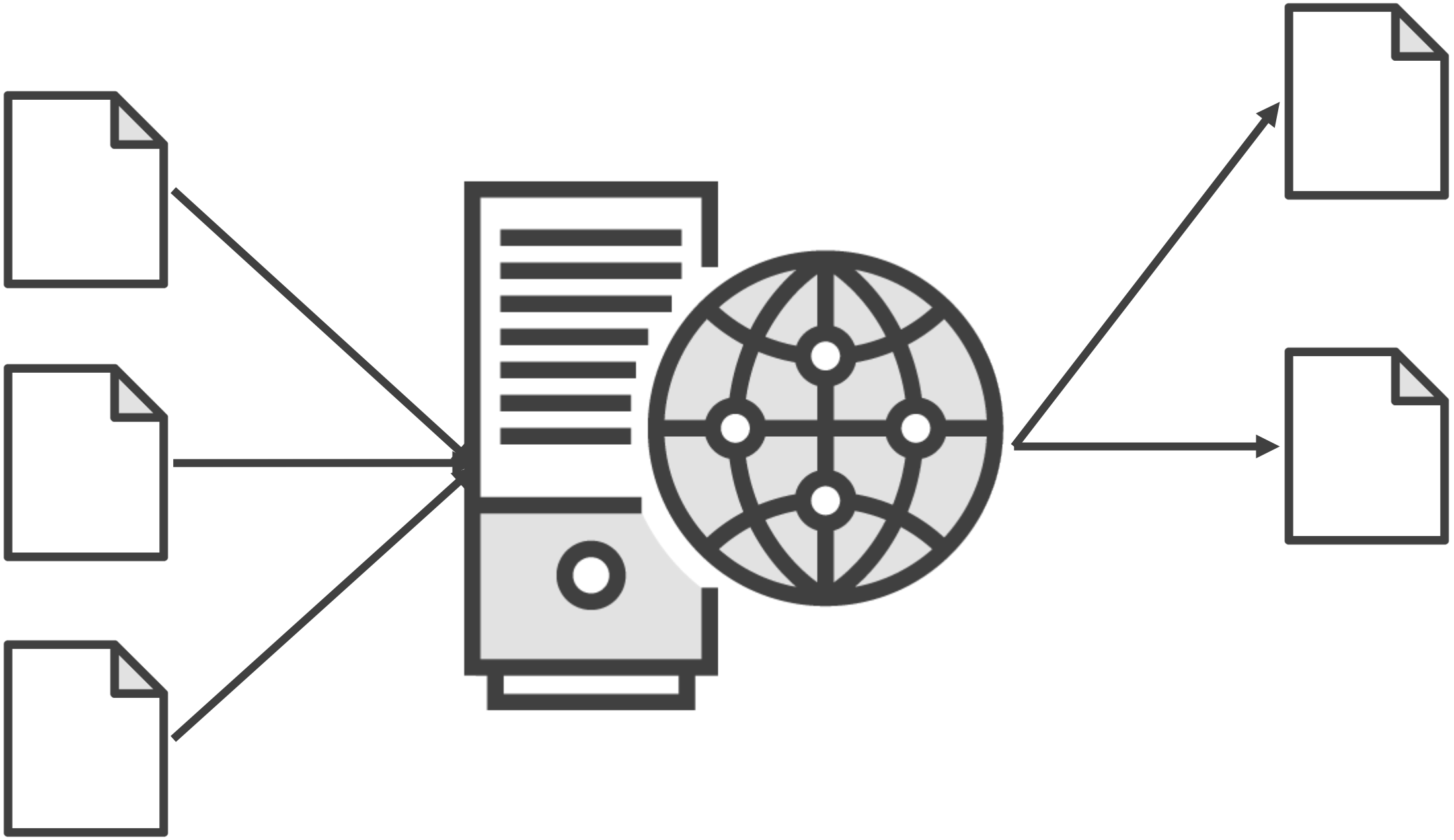
Kafka Basics

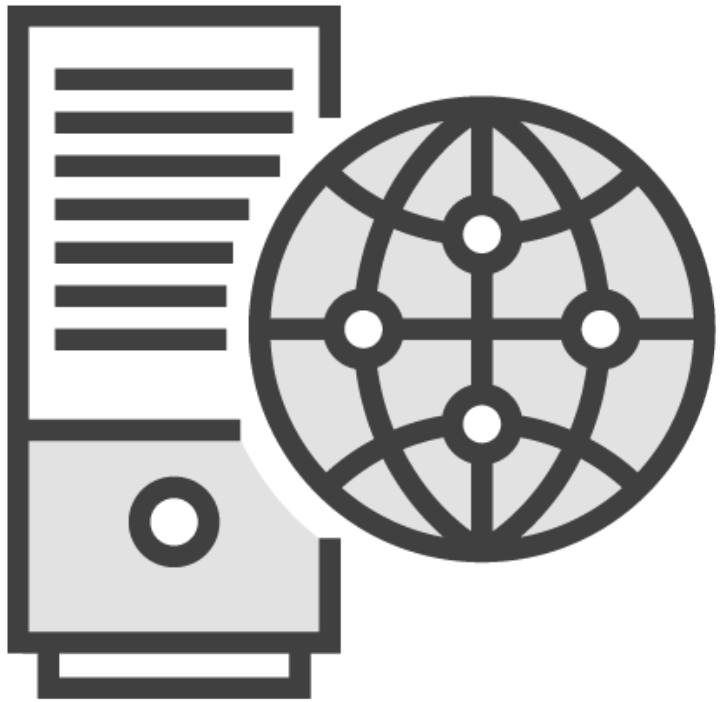
- Brokers
- Zookeeper
- Producers
- Consumers

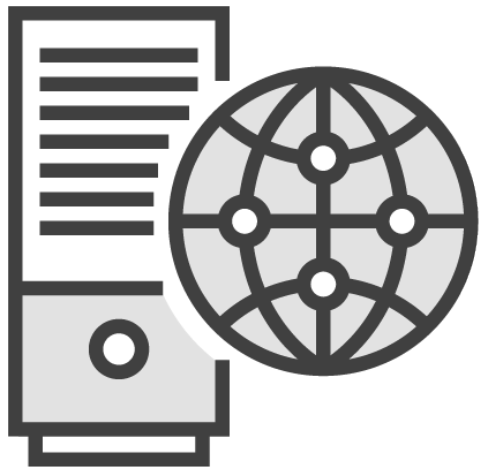
Kafka's Design:
A Perfect Fit For Microservices

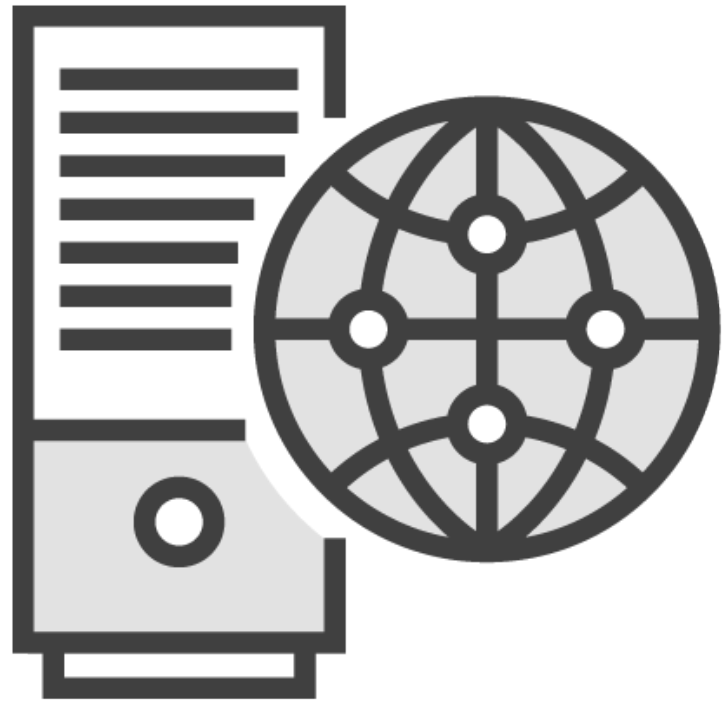
Apache Kafka® is *a distributed streaming platform*

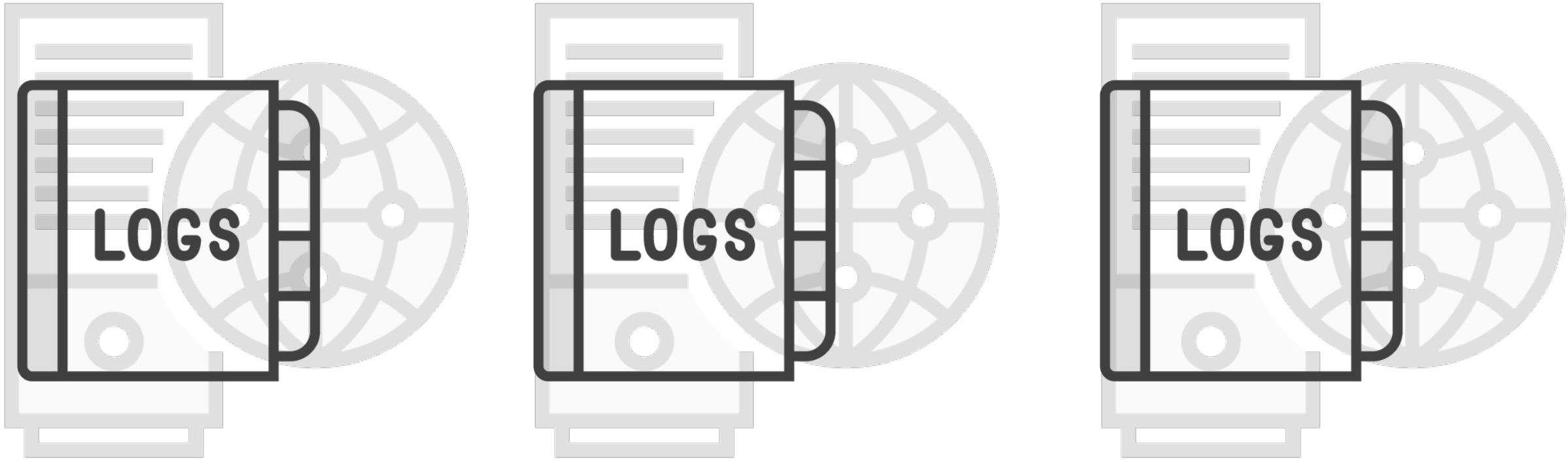
https://kafka.apache.org/intro







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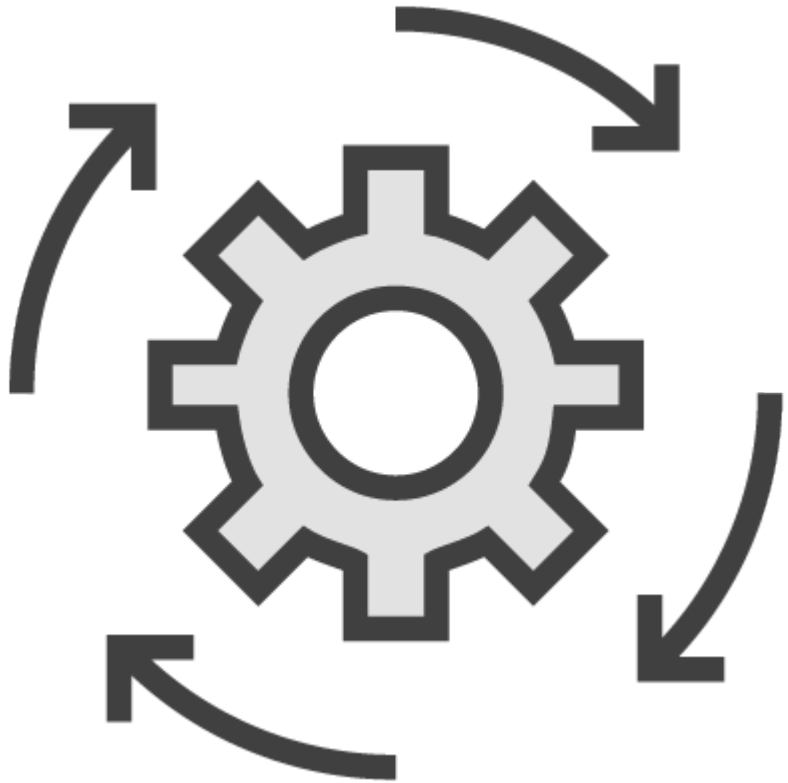

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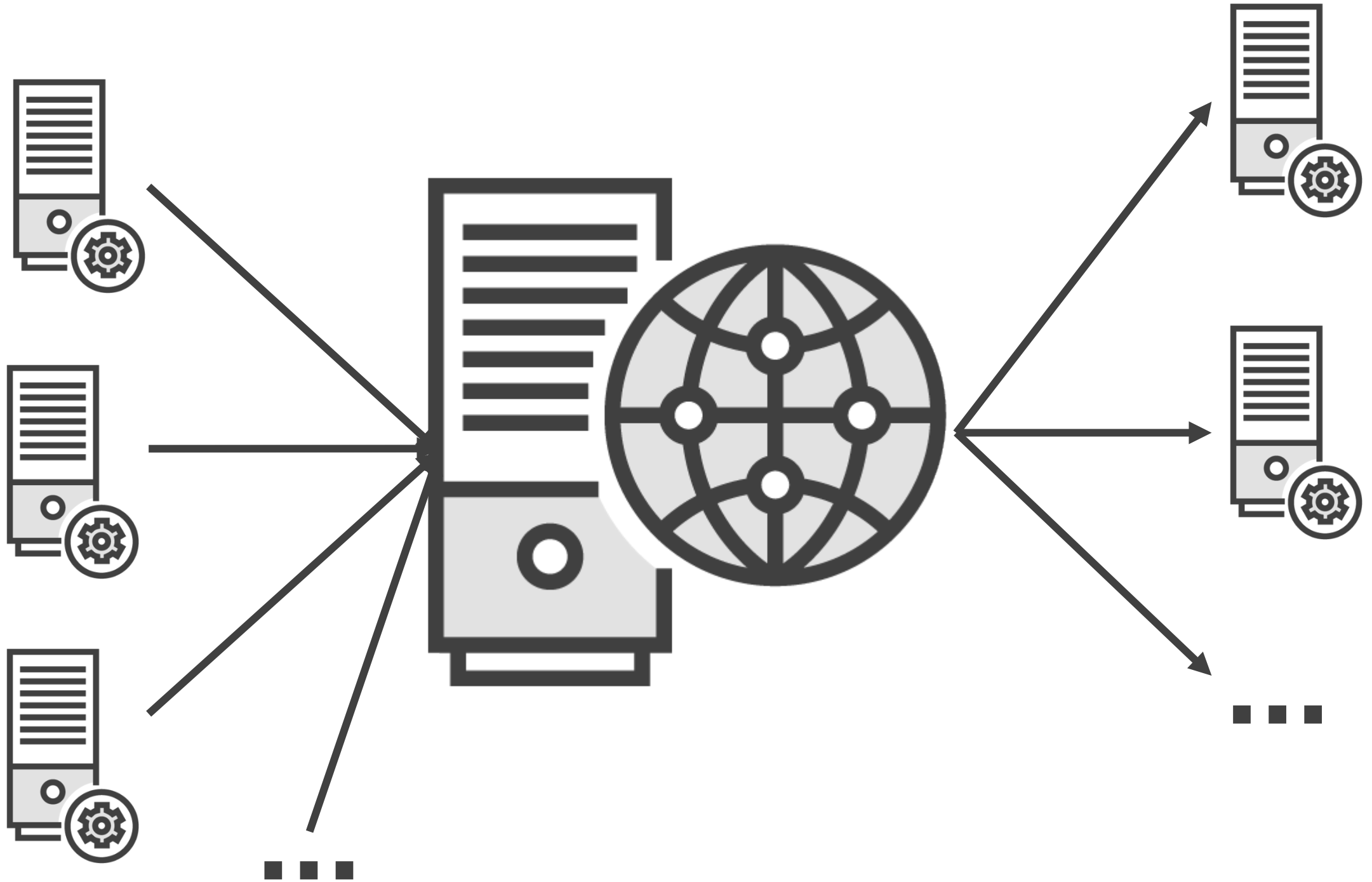
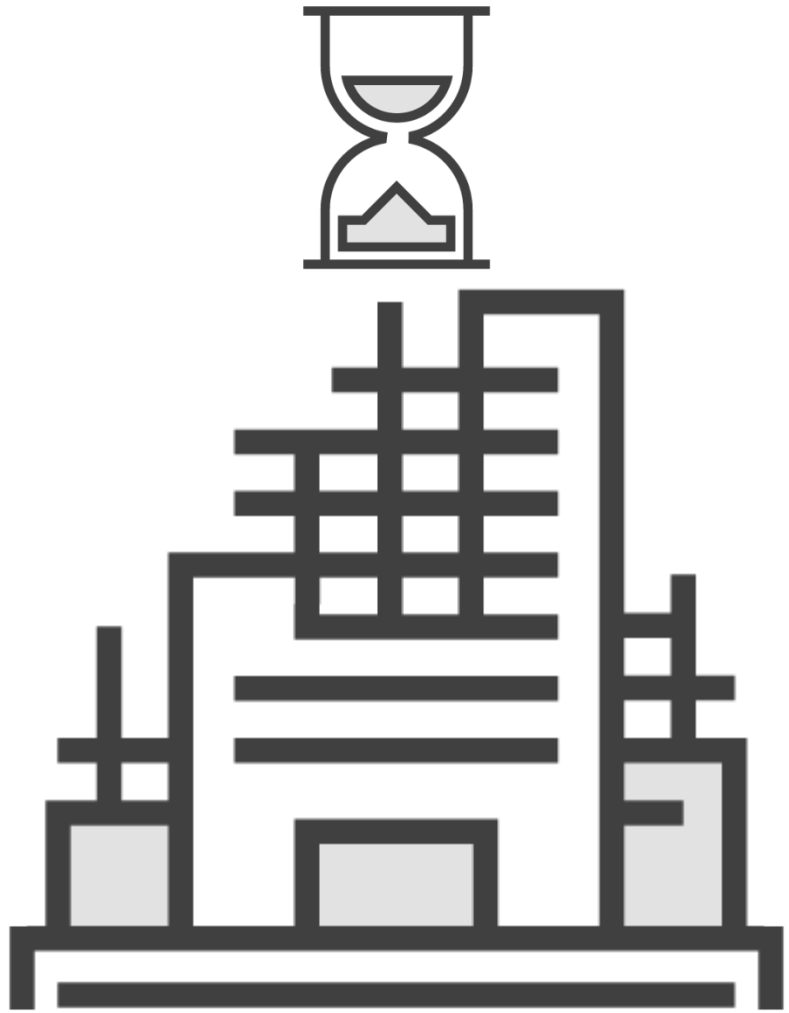
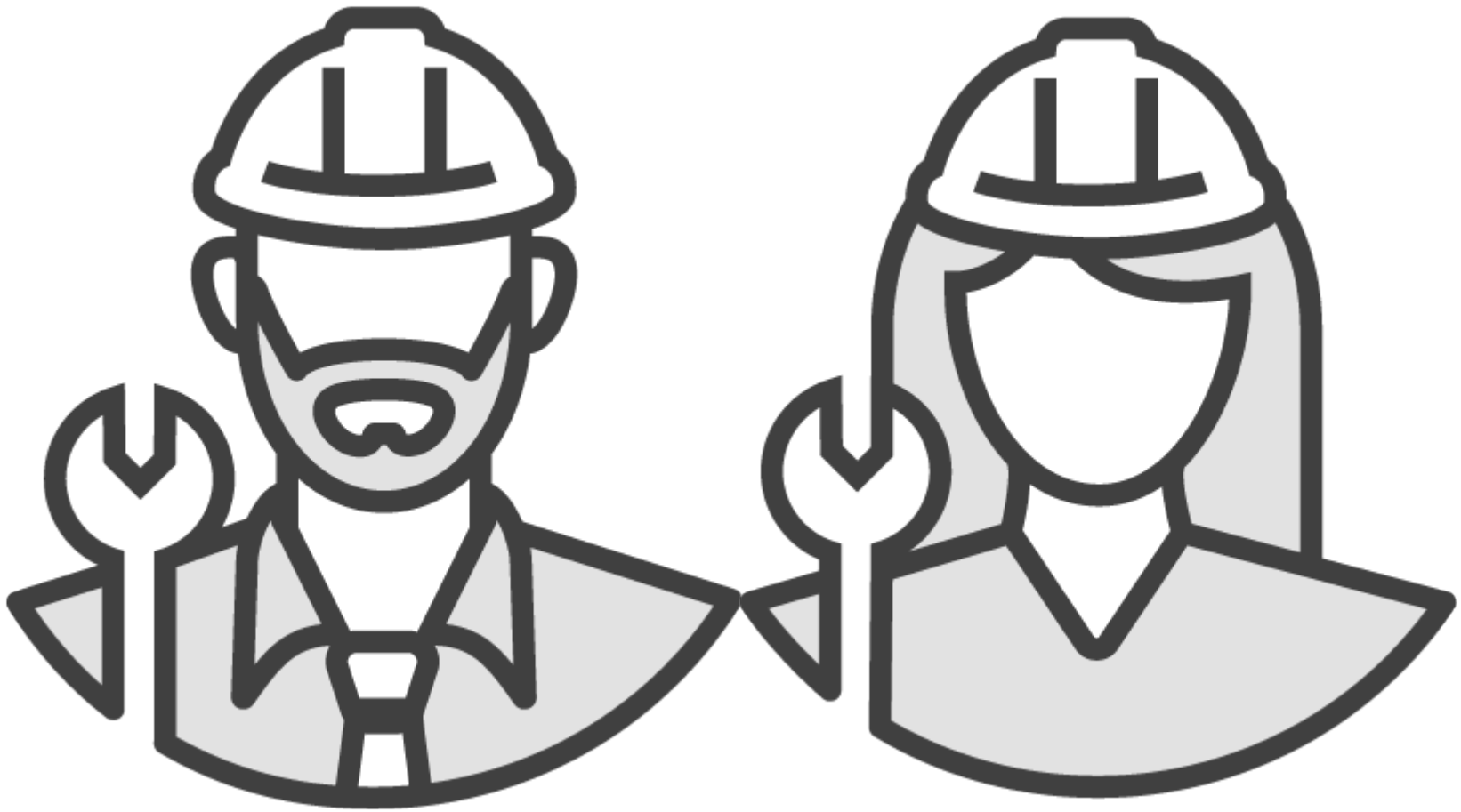
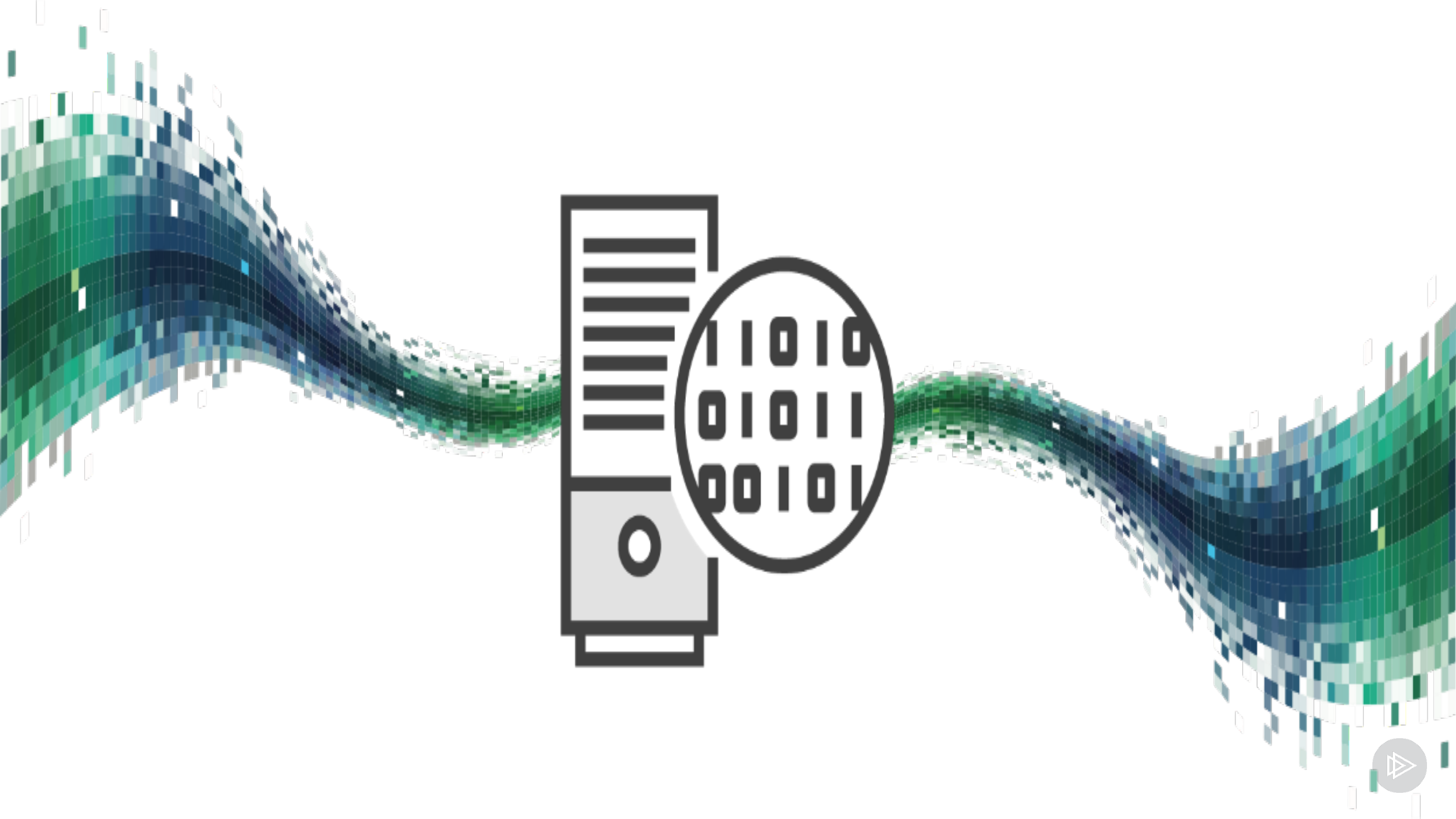
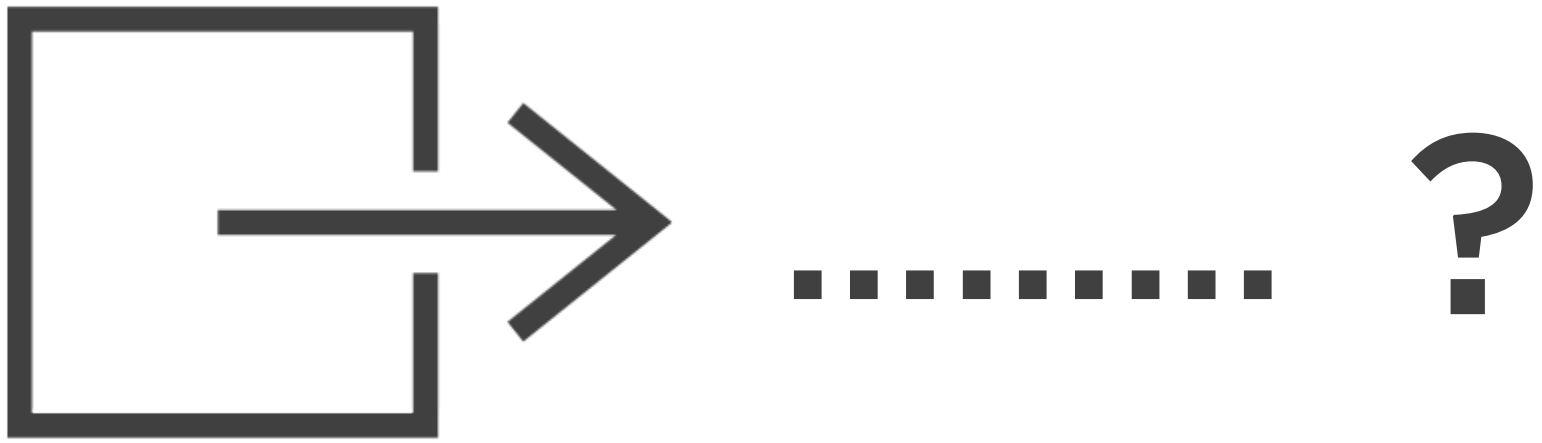
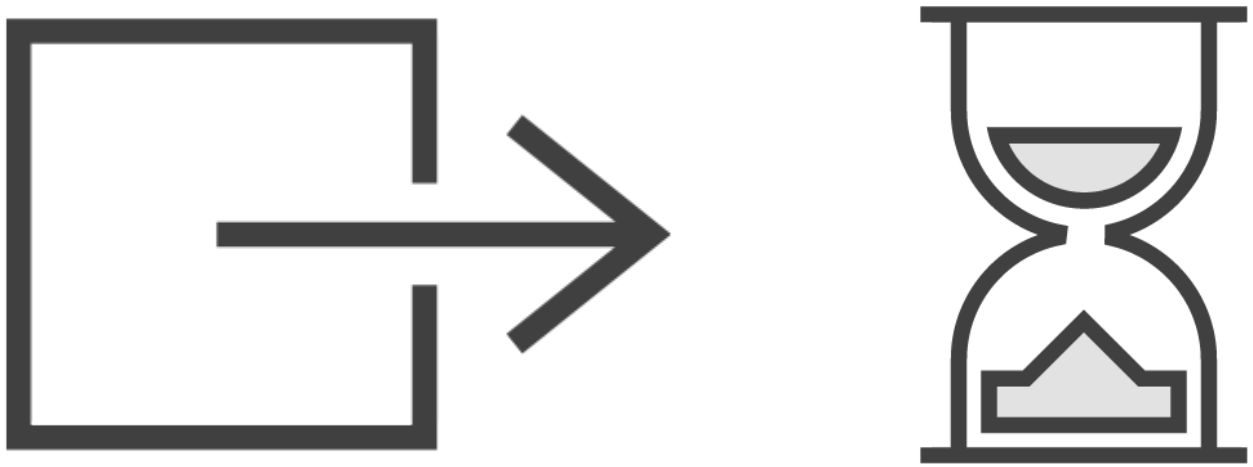


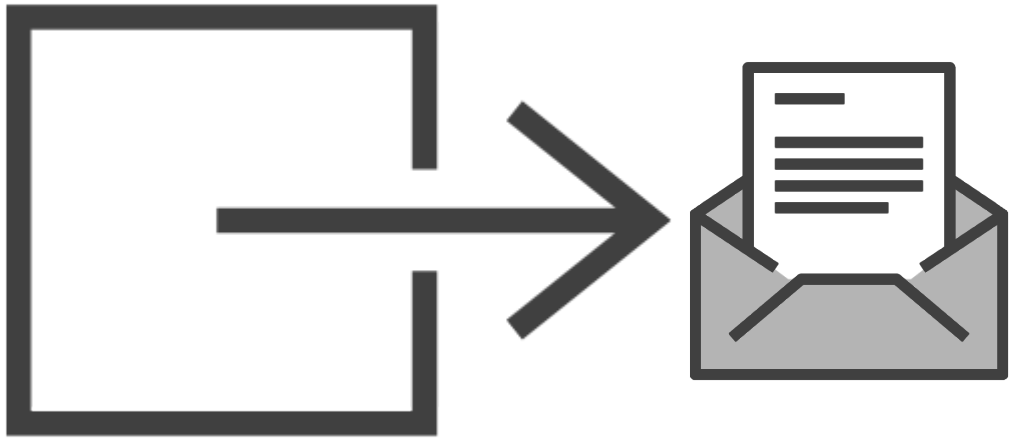




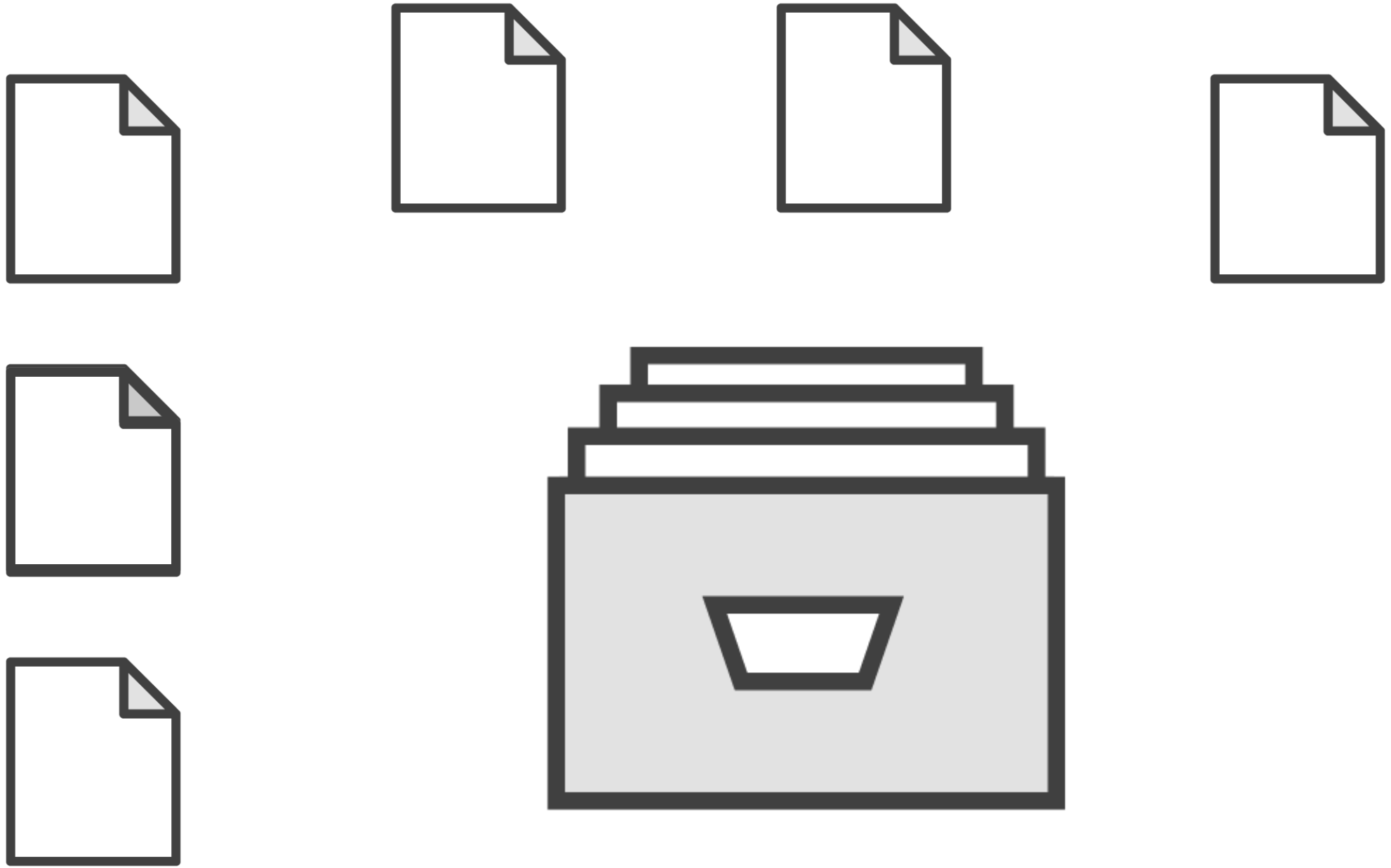


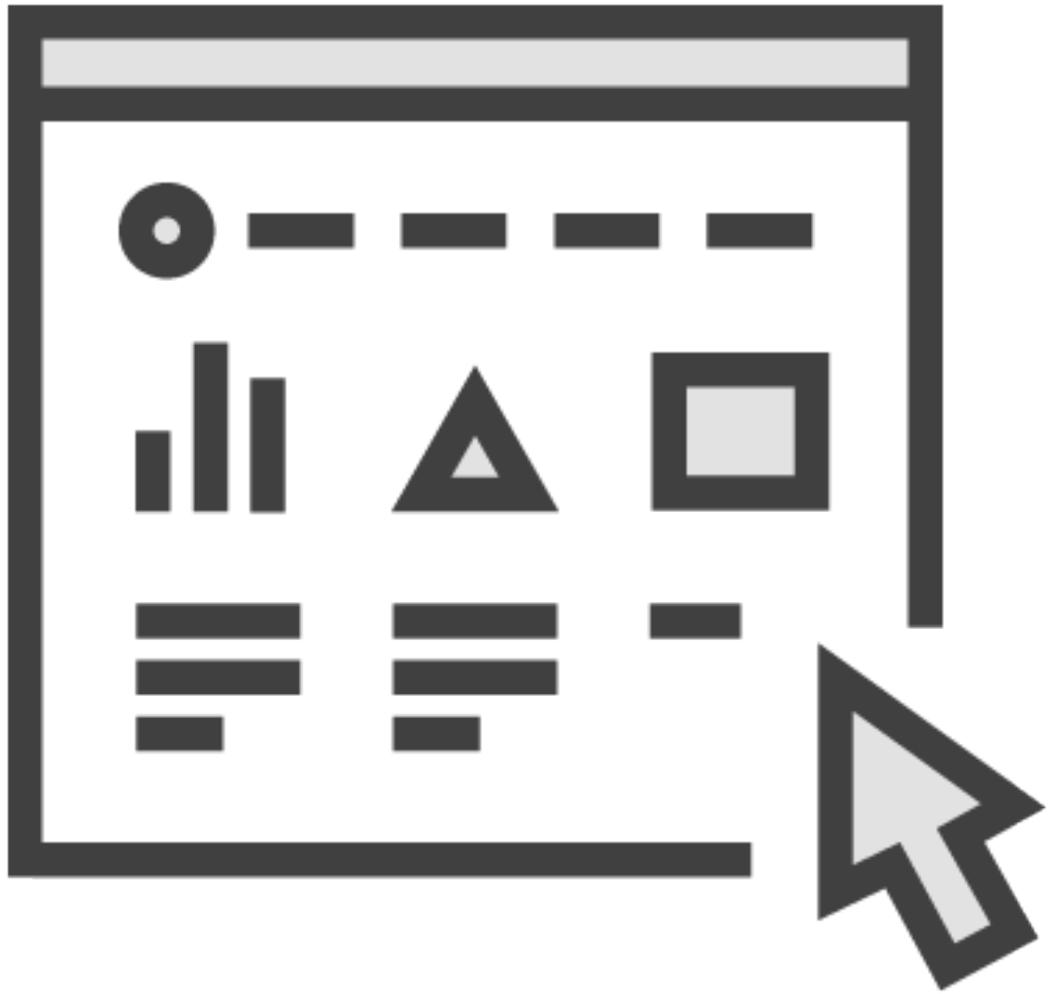




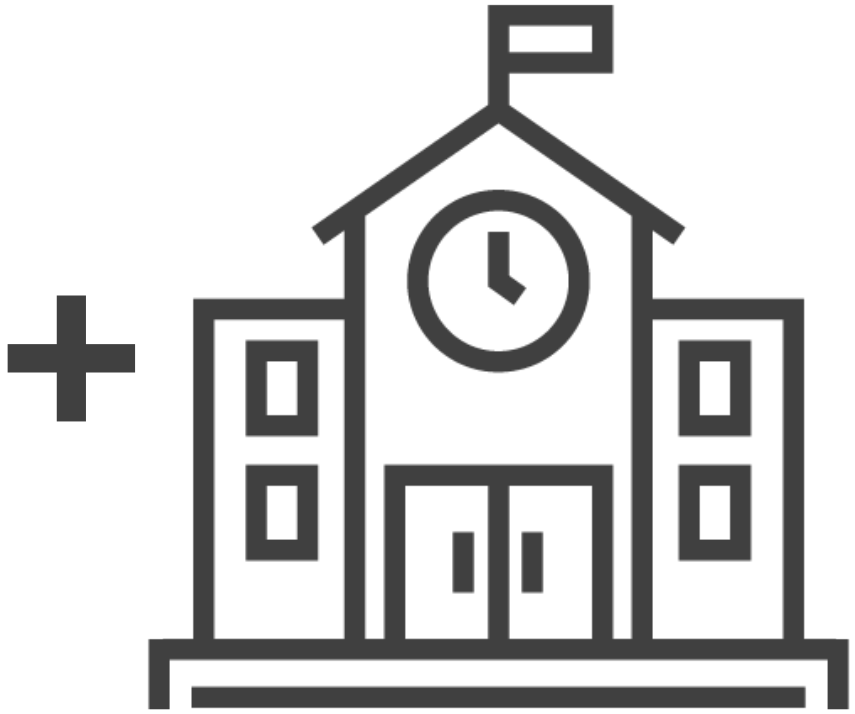


Kafka Uses





APACHE KAFKA



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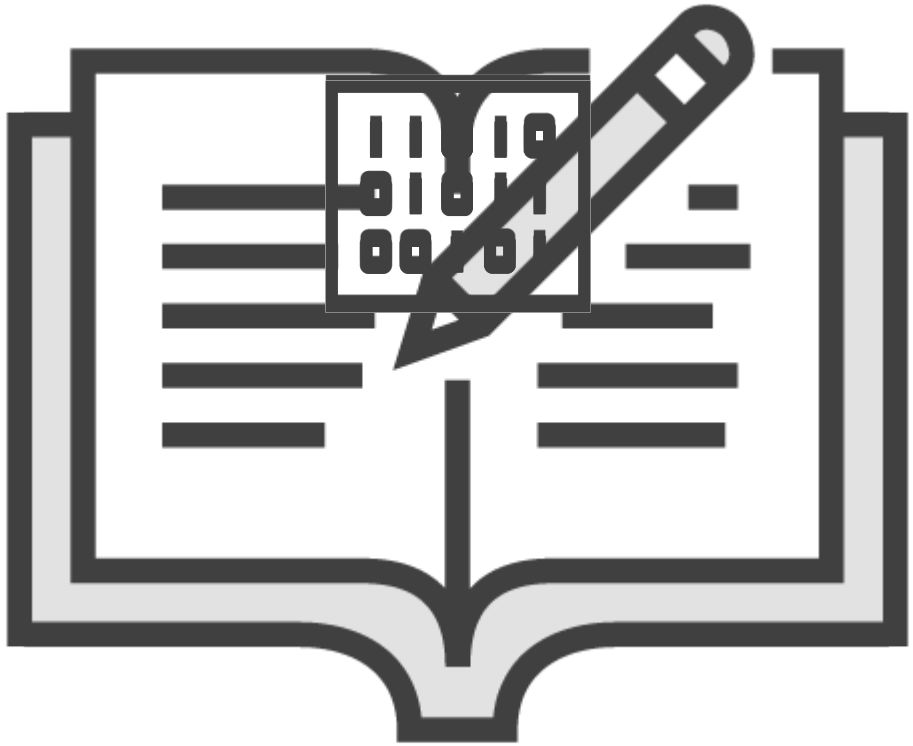

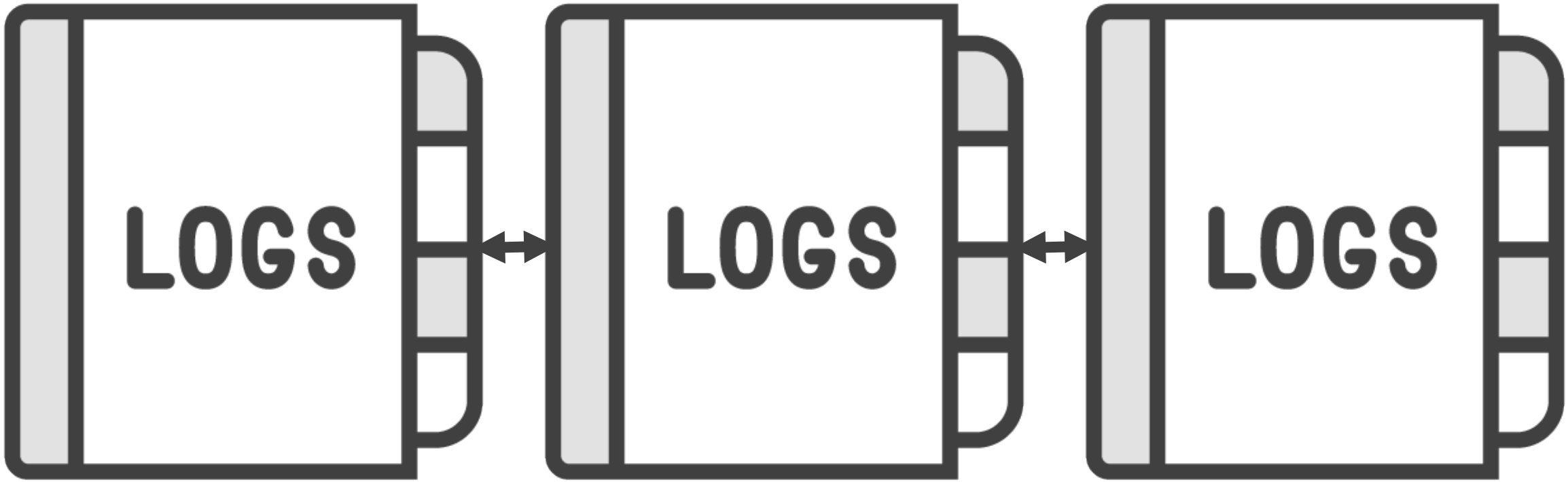
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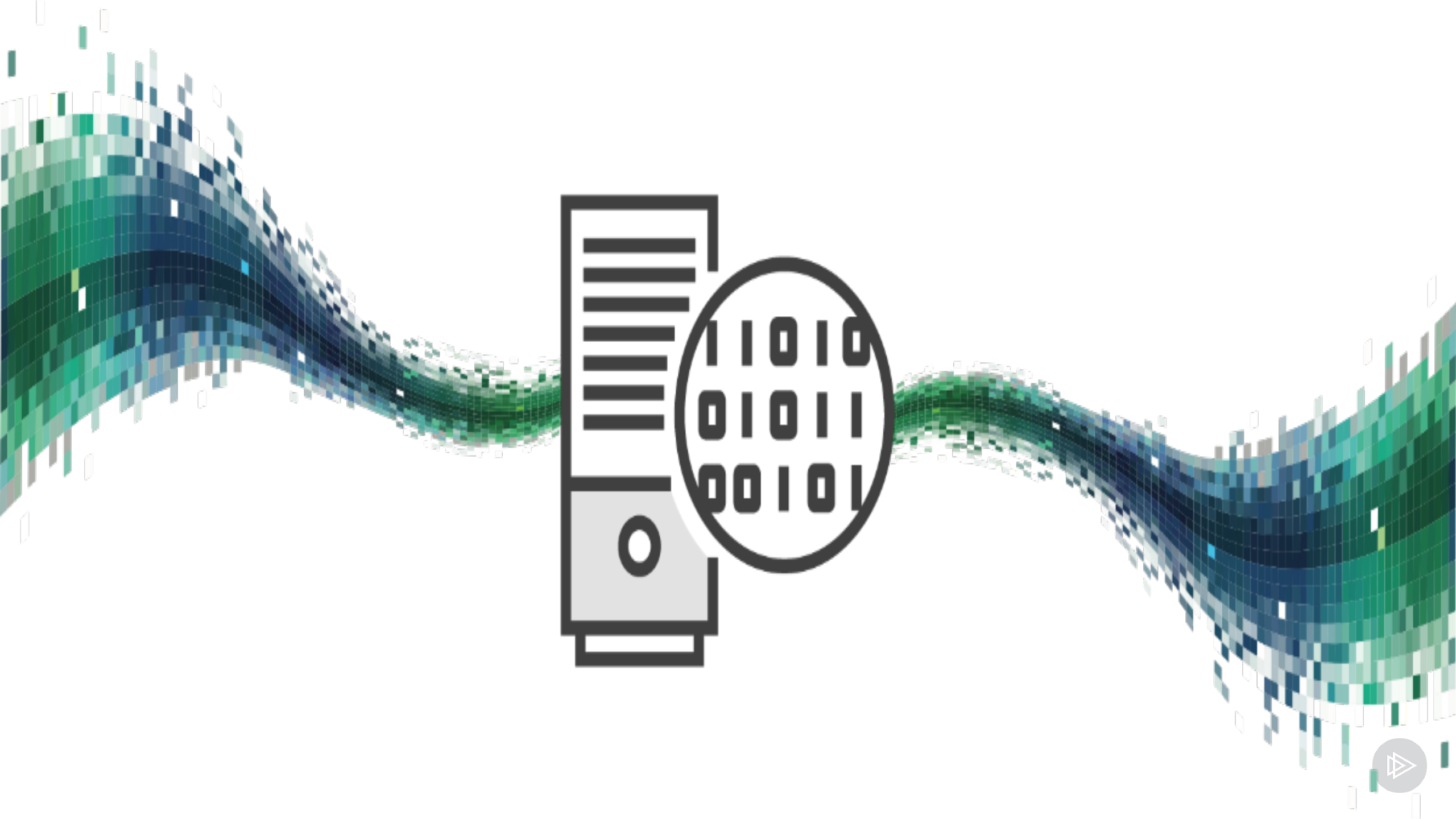
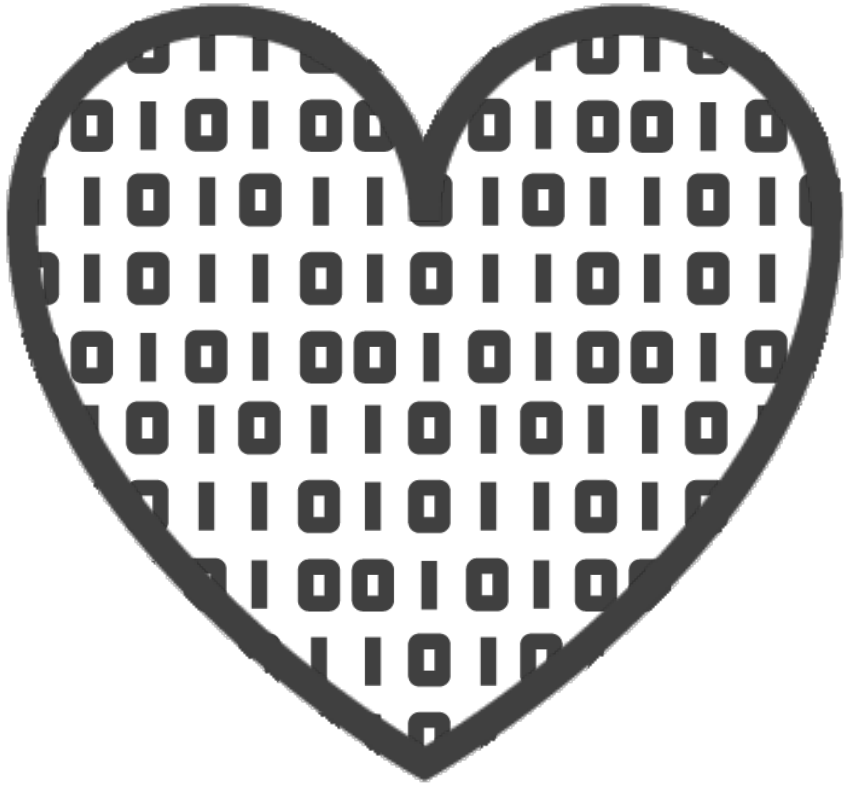
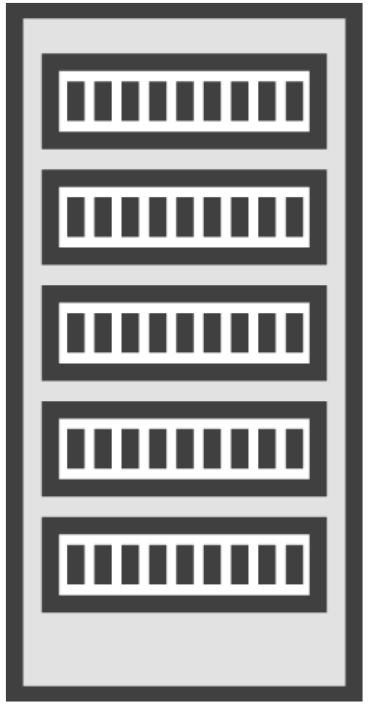


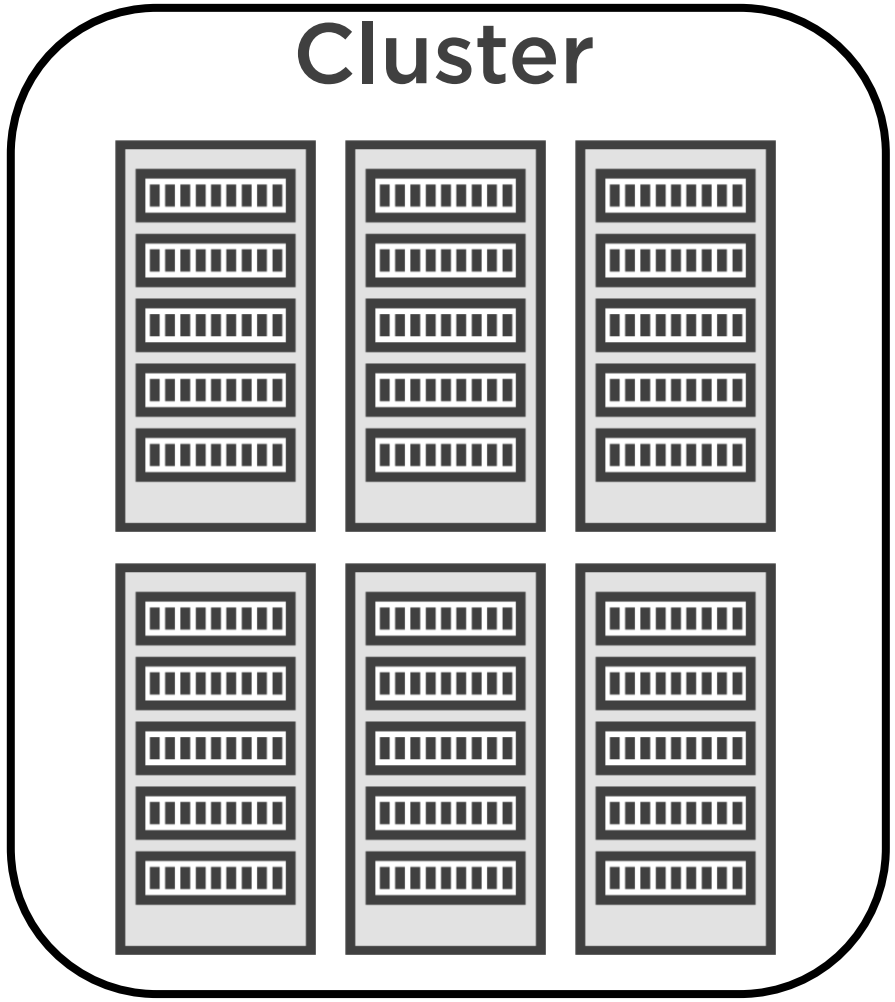

Scala
Java™

Kafka's Architecture Overview


BROKER



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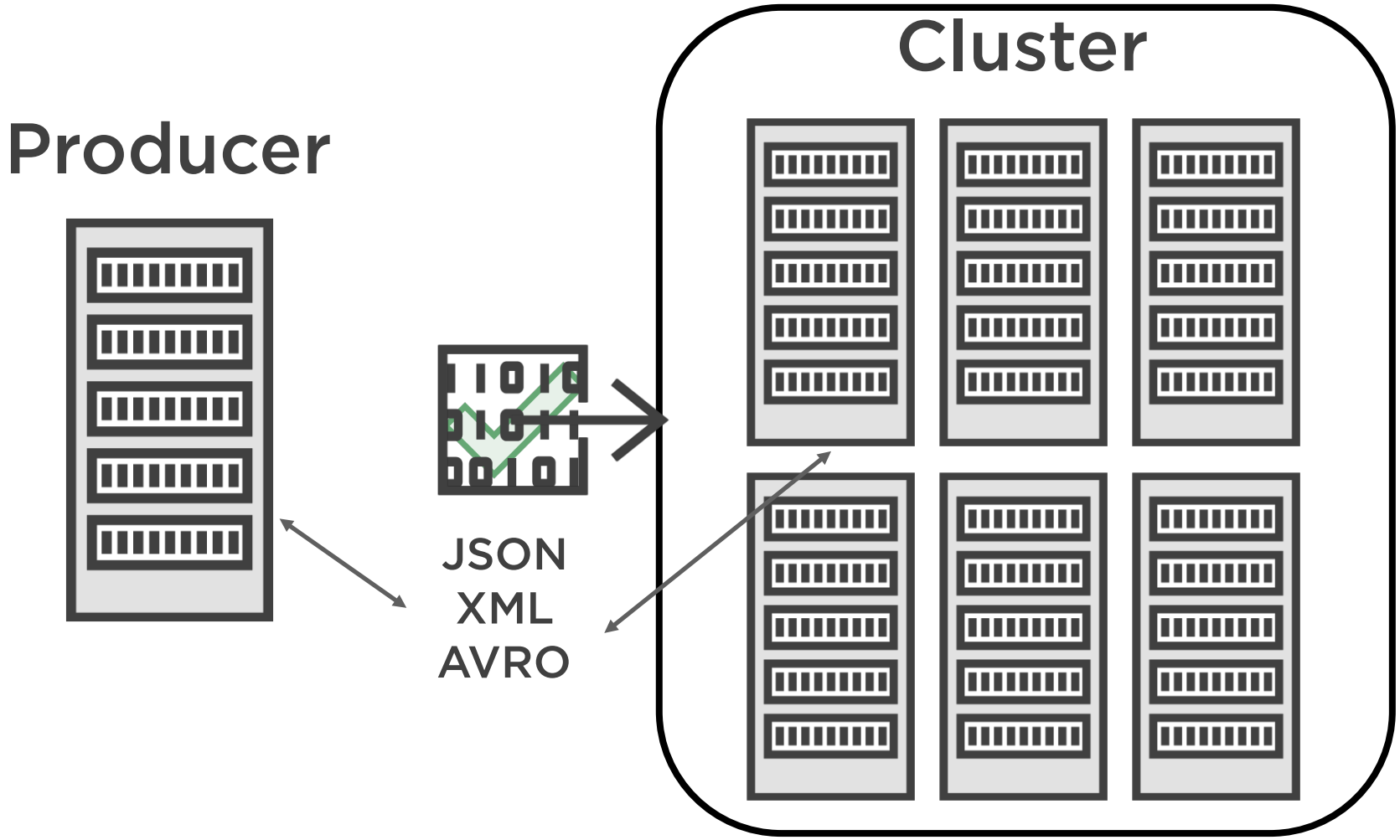
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Cluster
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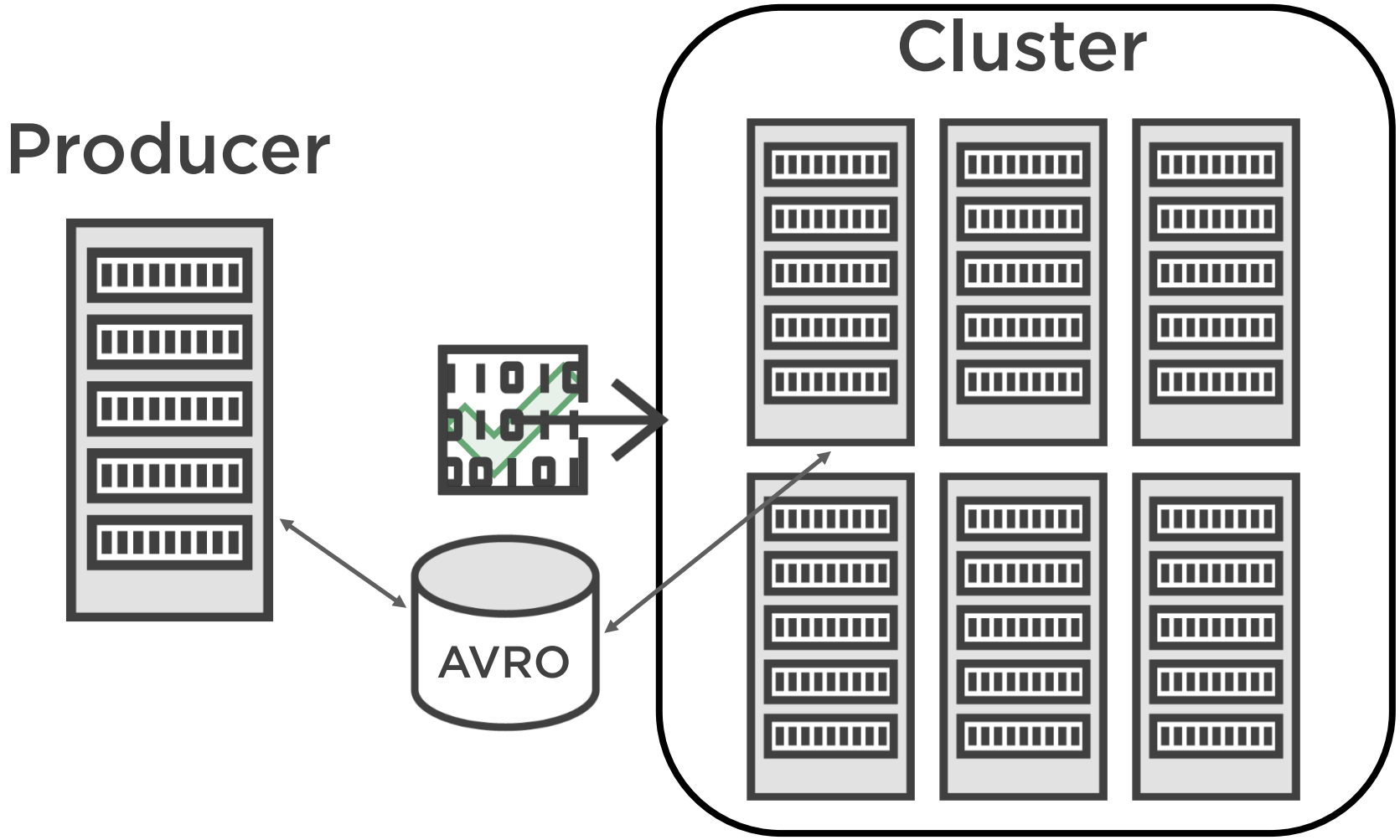
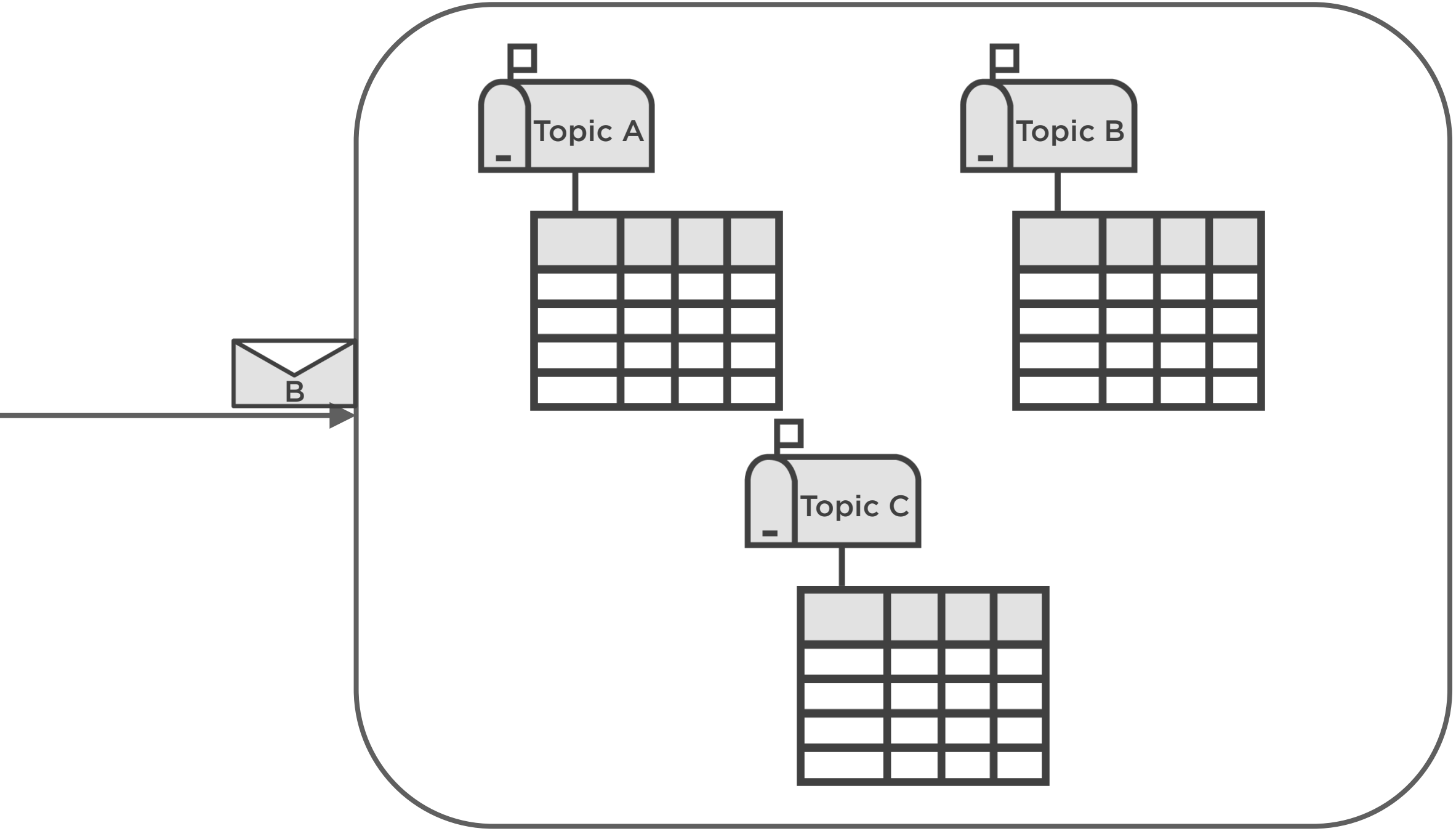
XML
AVRO


Cluster
Producer
AVRO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Topic C
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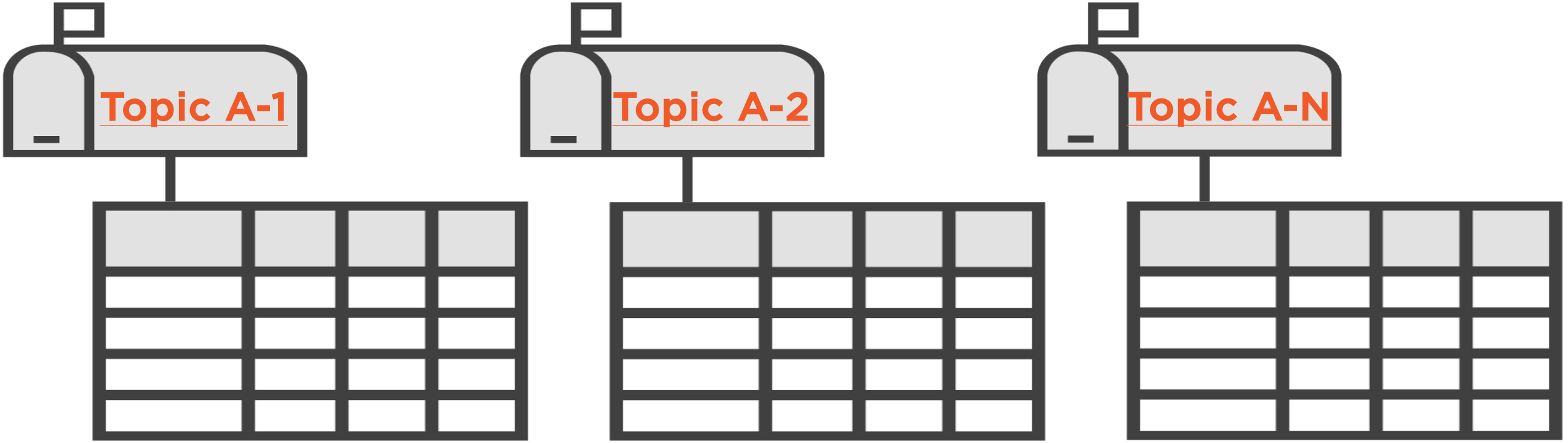
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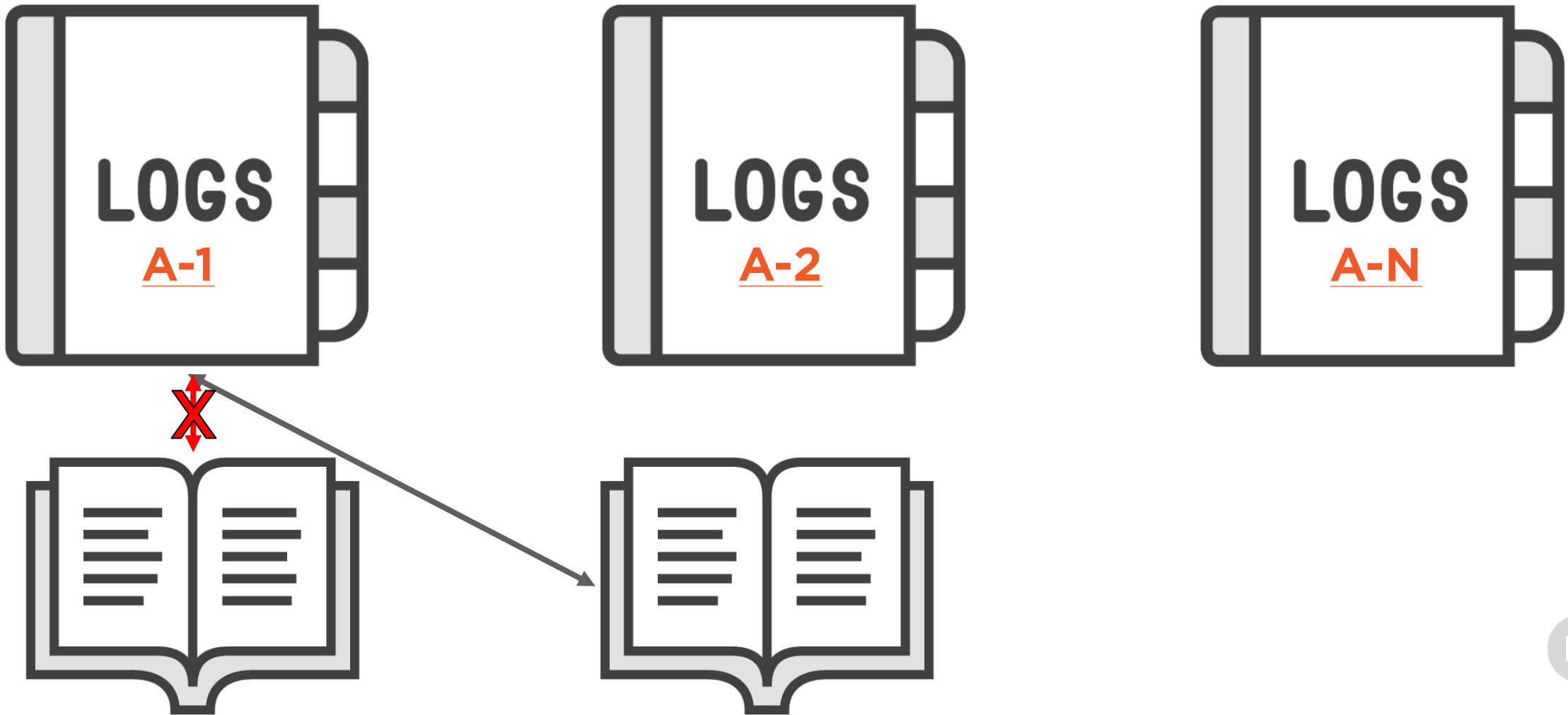
Topic A-2
Topic A-N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A-2
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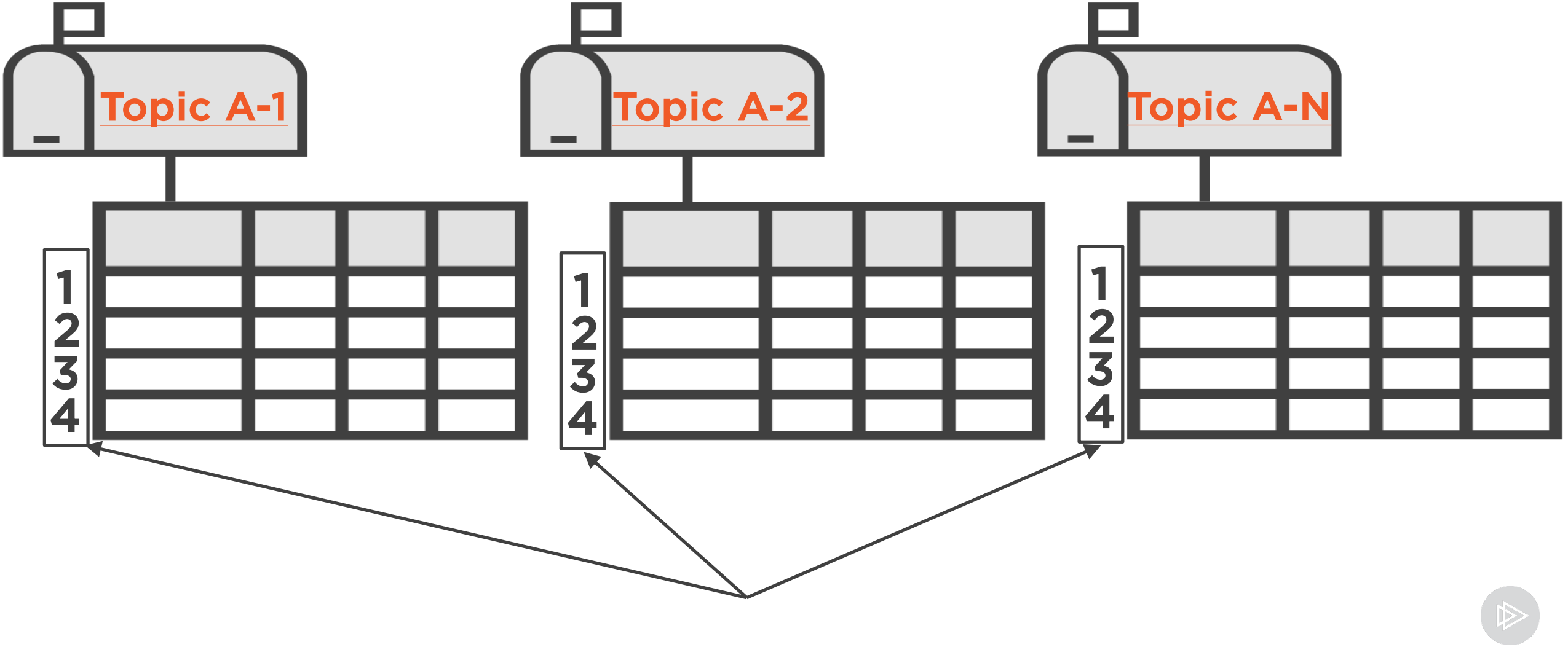
A-N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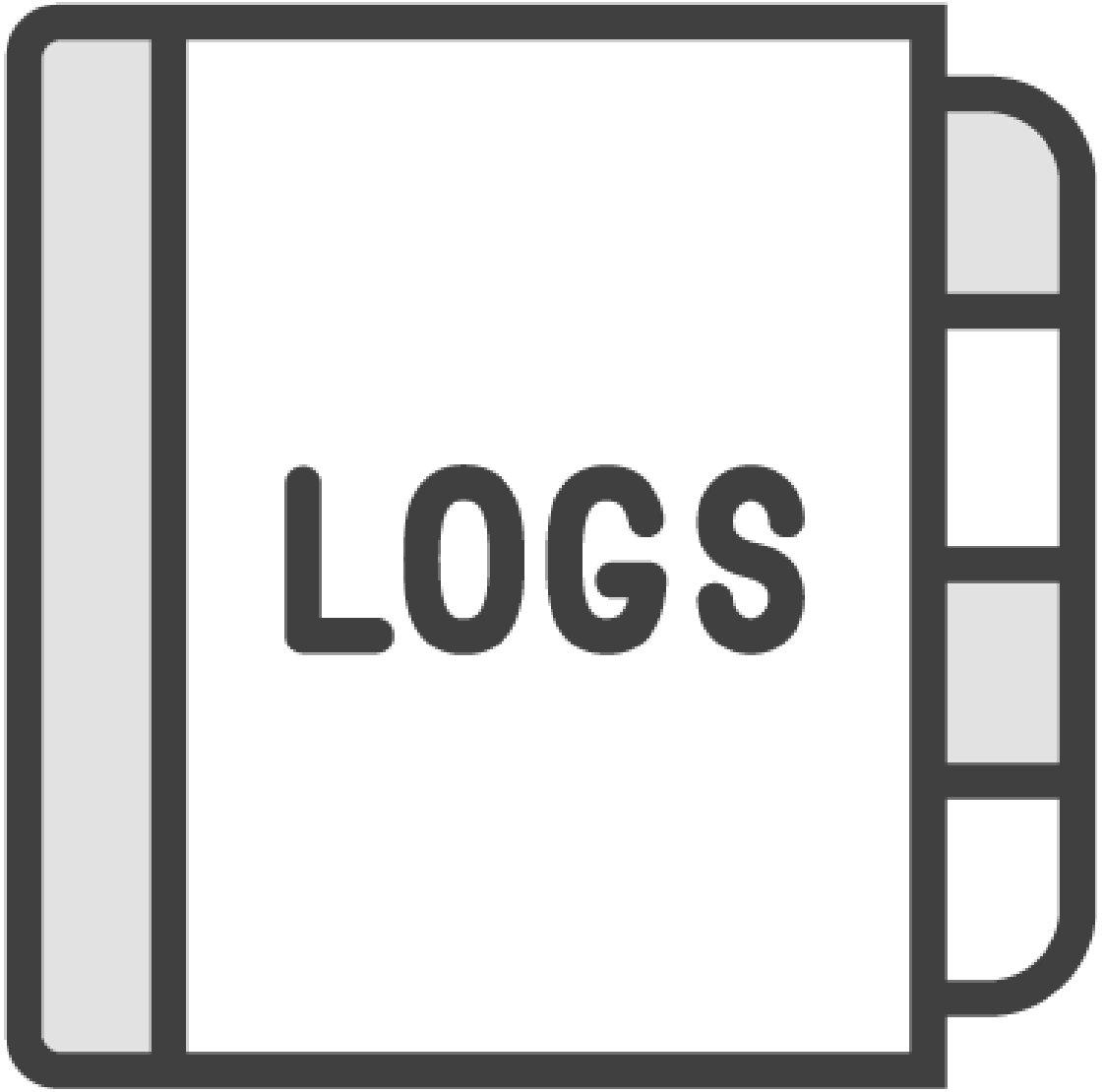
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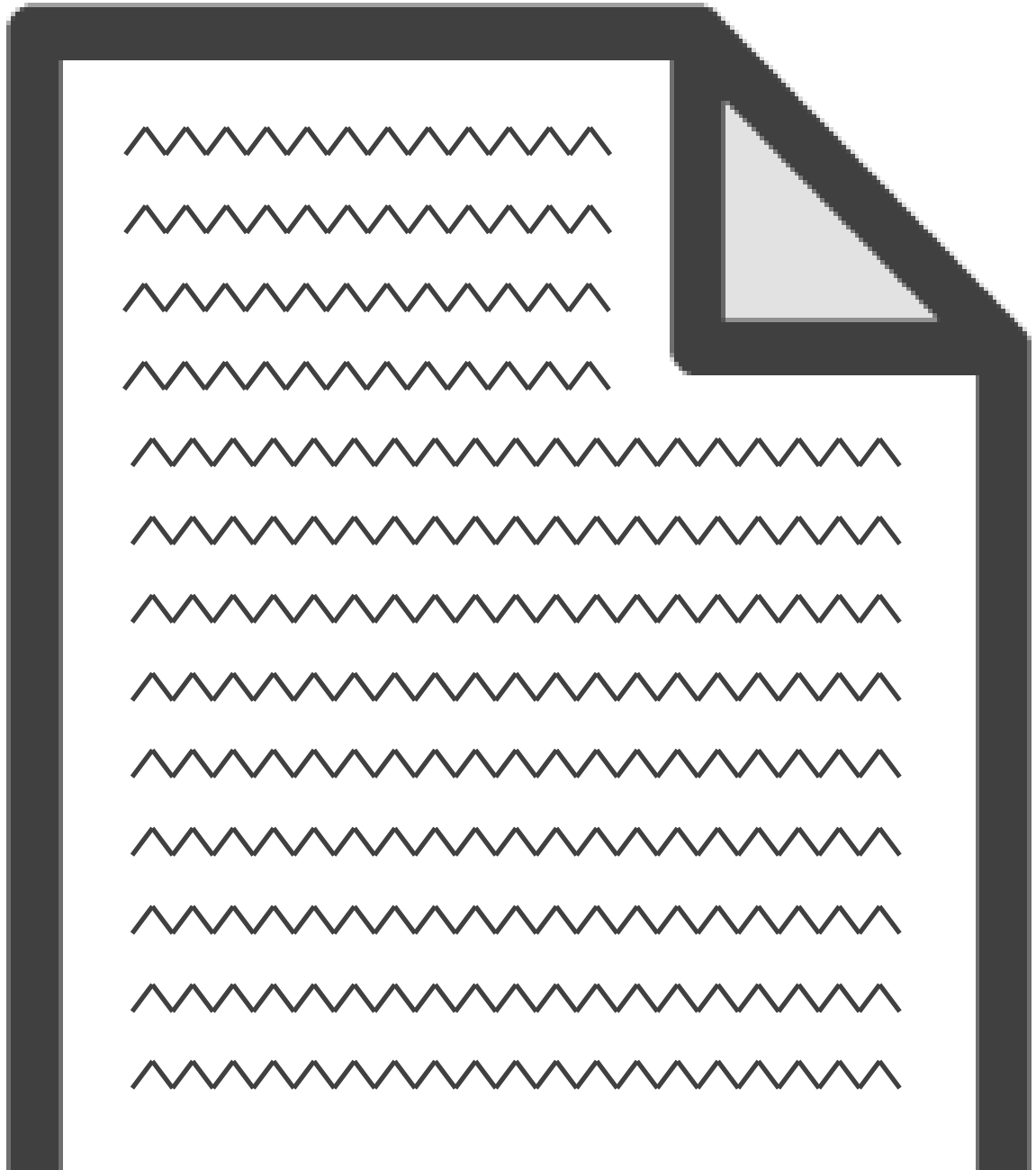

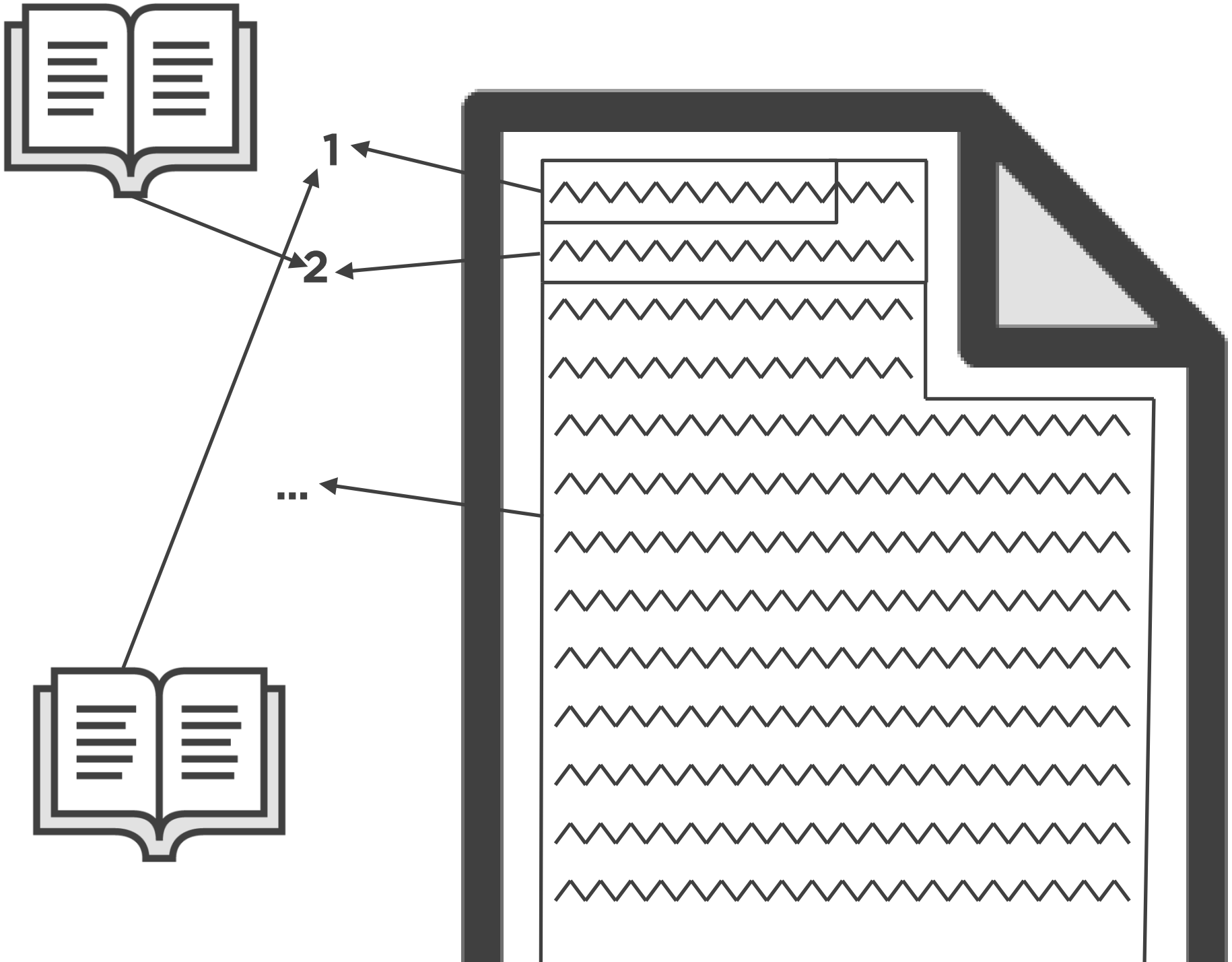
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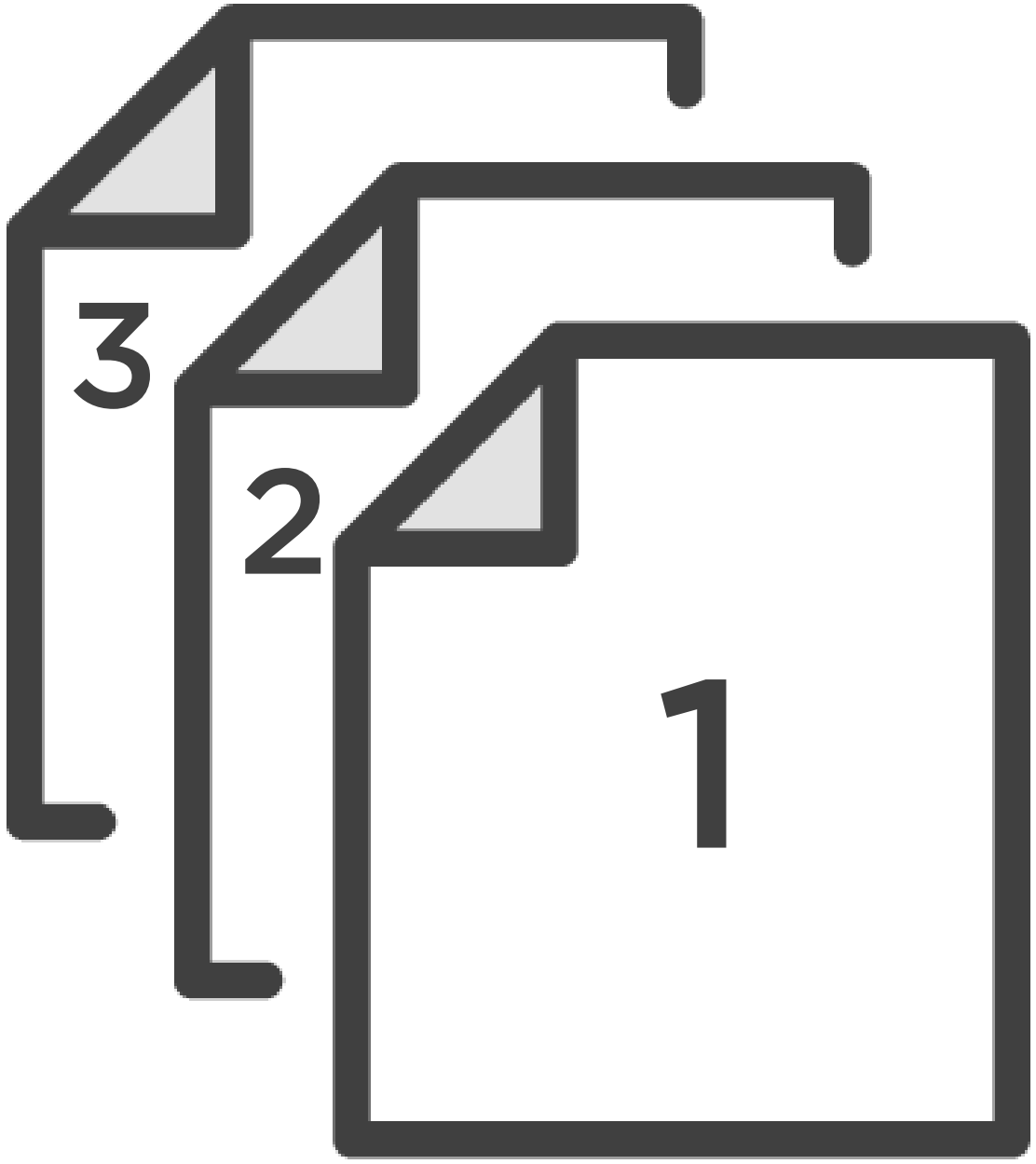
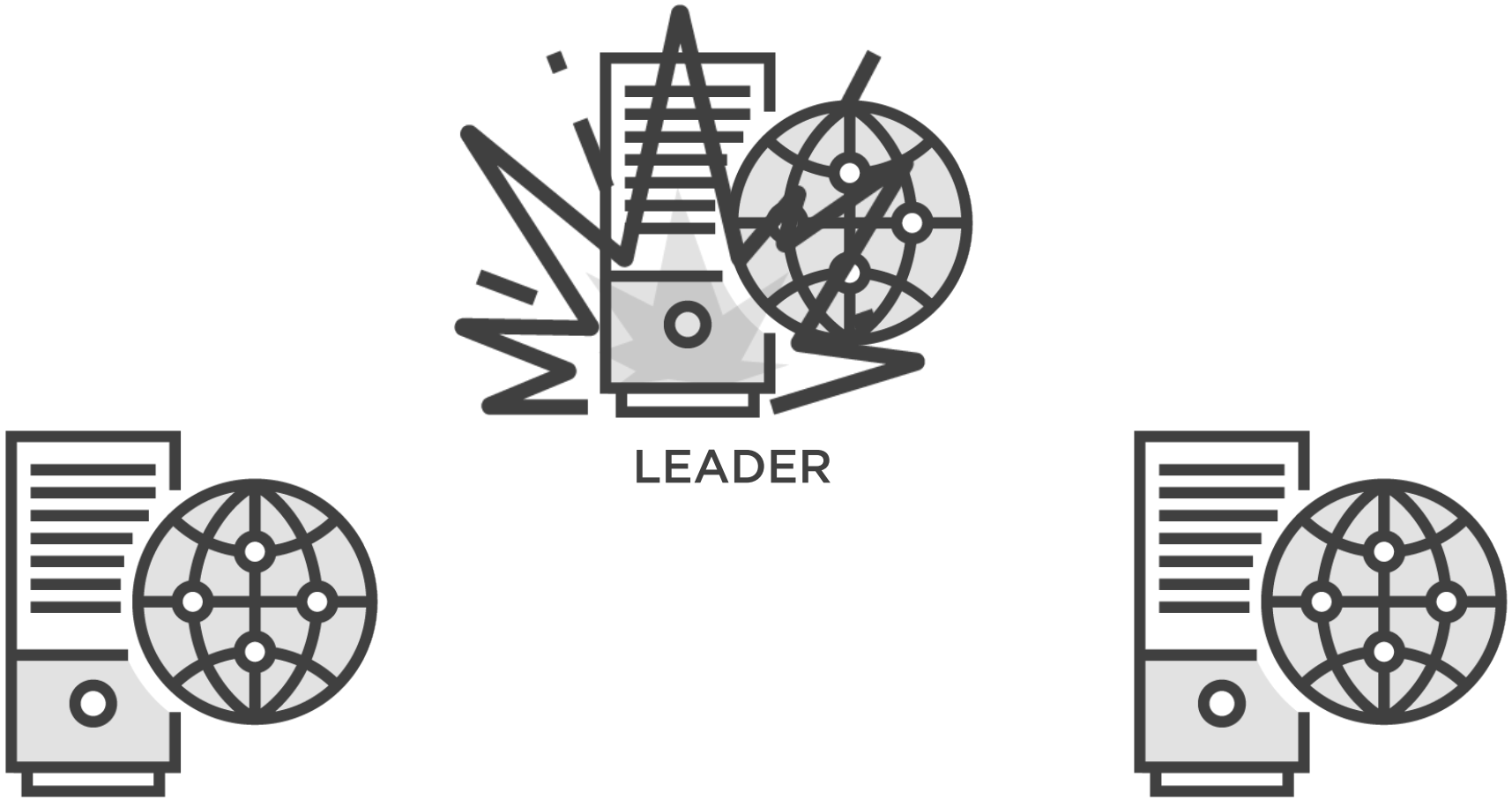

3
2
1

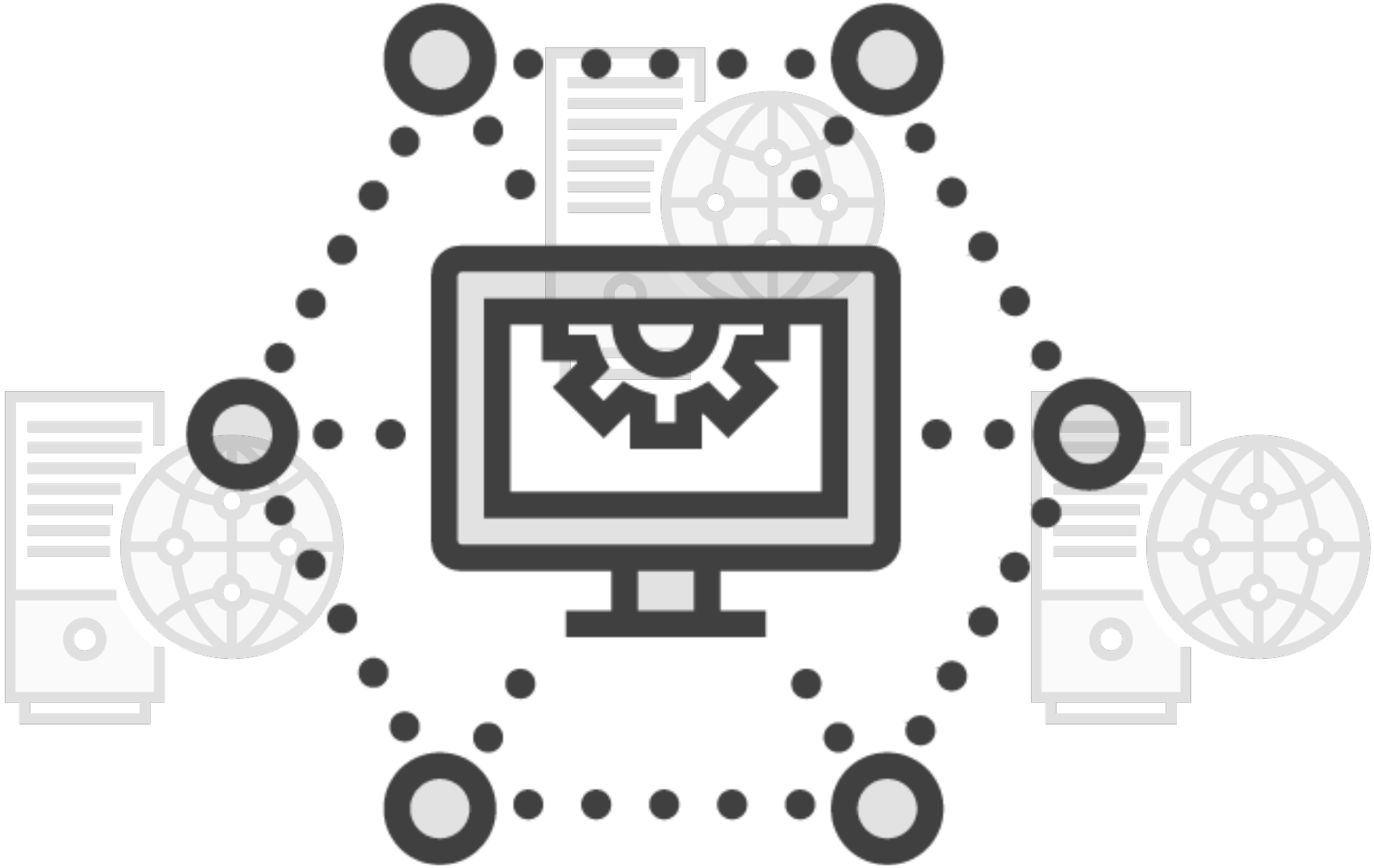
Apache ZooKeeper

...a centralized service for maintaining configuration information, naming, providing distributed synchronization, and providing group services.

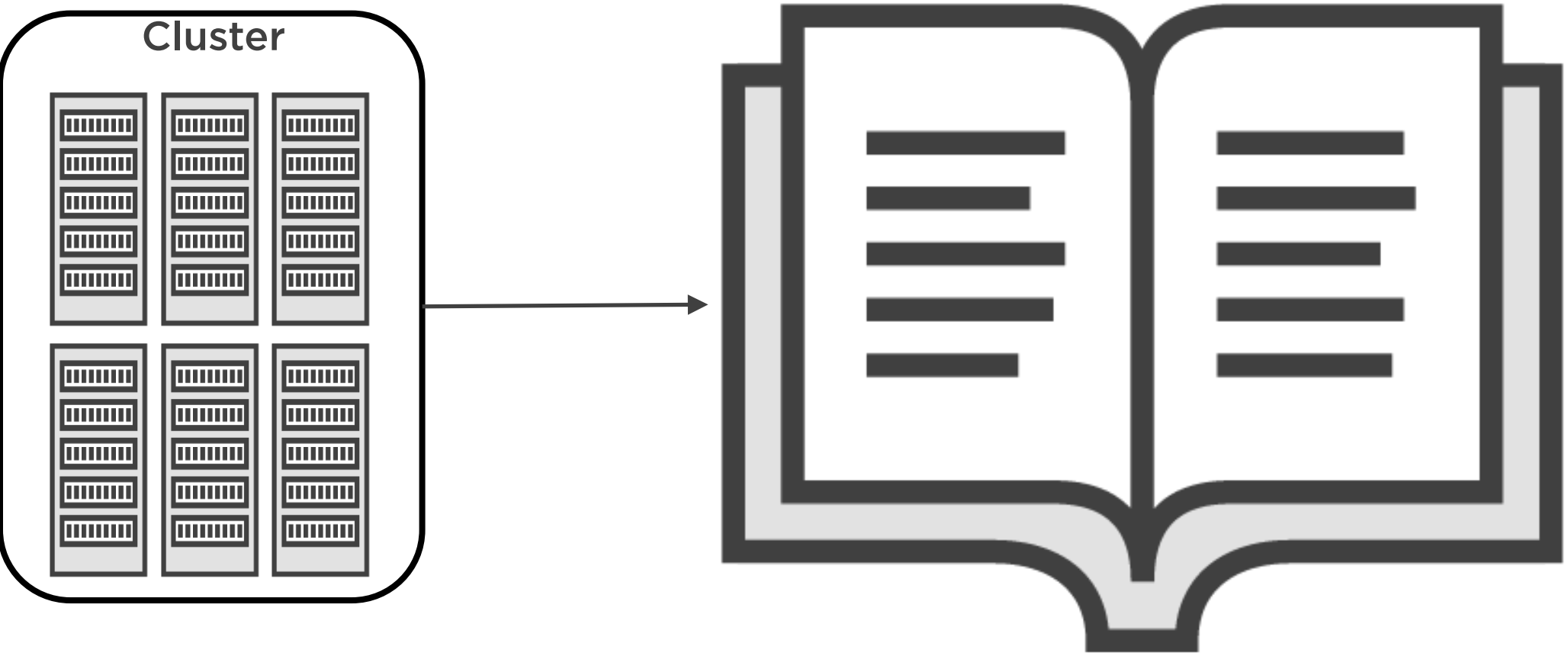
Apache ZooKeeper



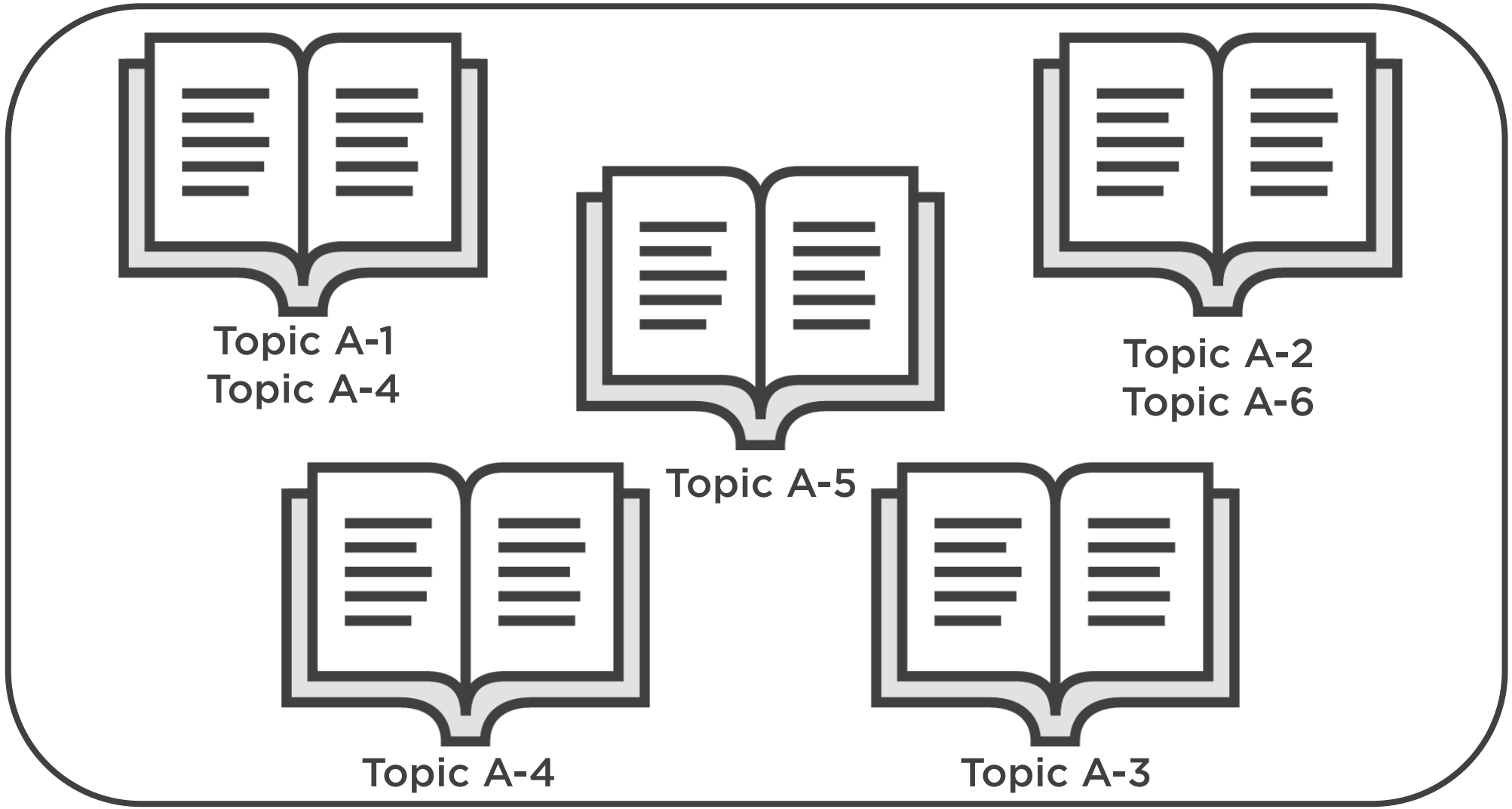
Apache ZooKeeper



Consumer

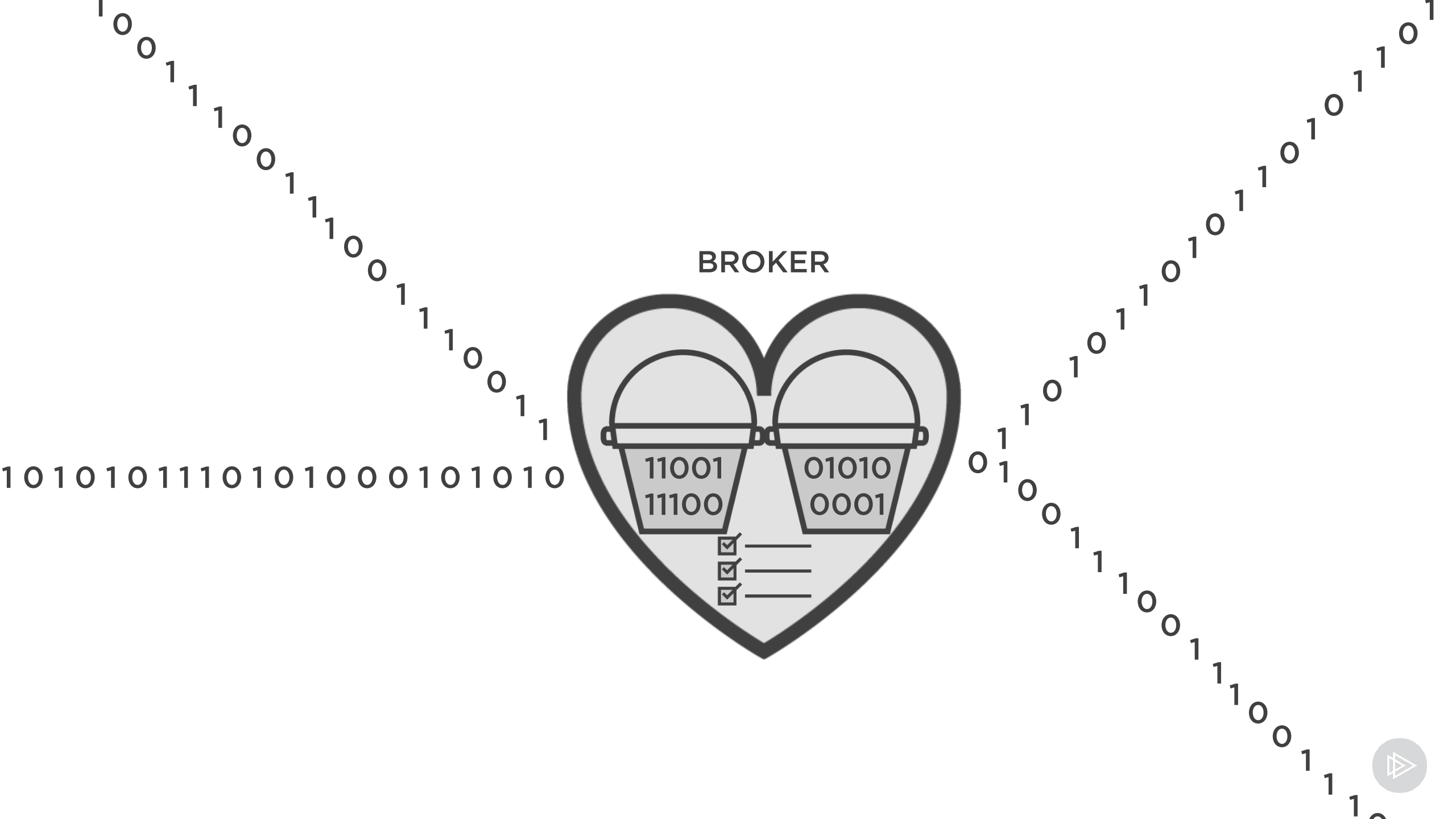


Consumer Group




APACHE
kafka®

Kafka's Heart: The Broker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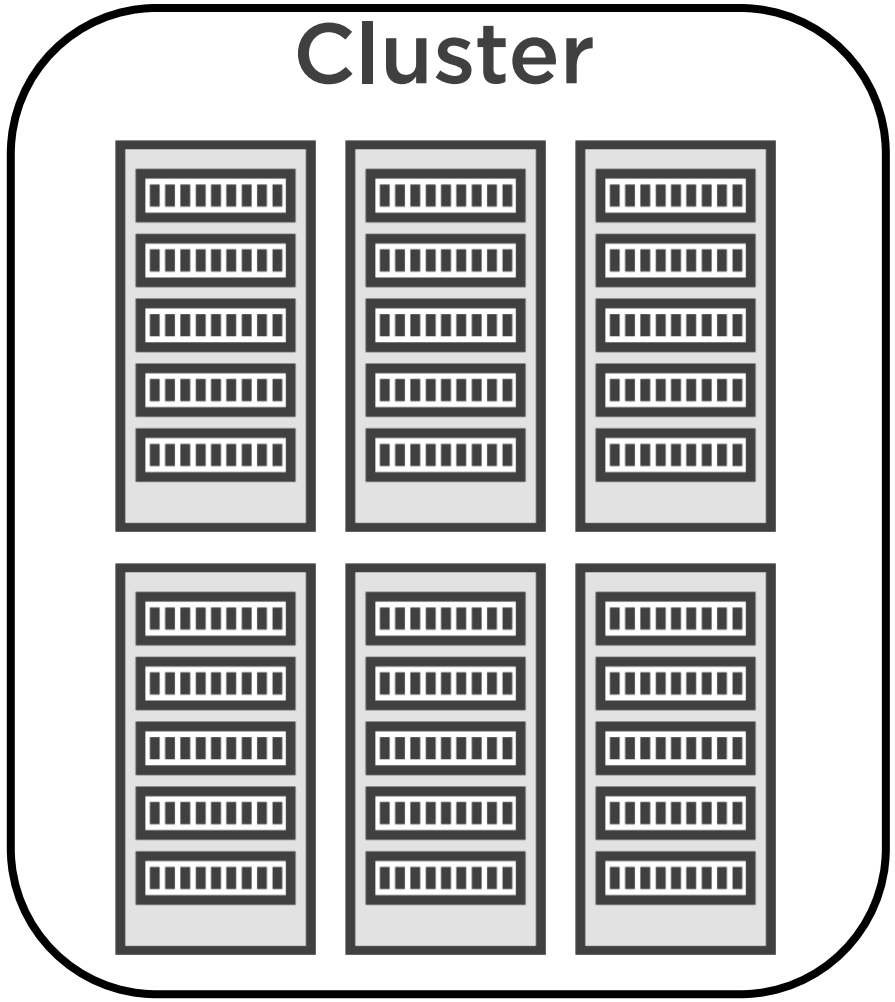
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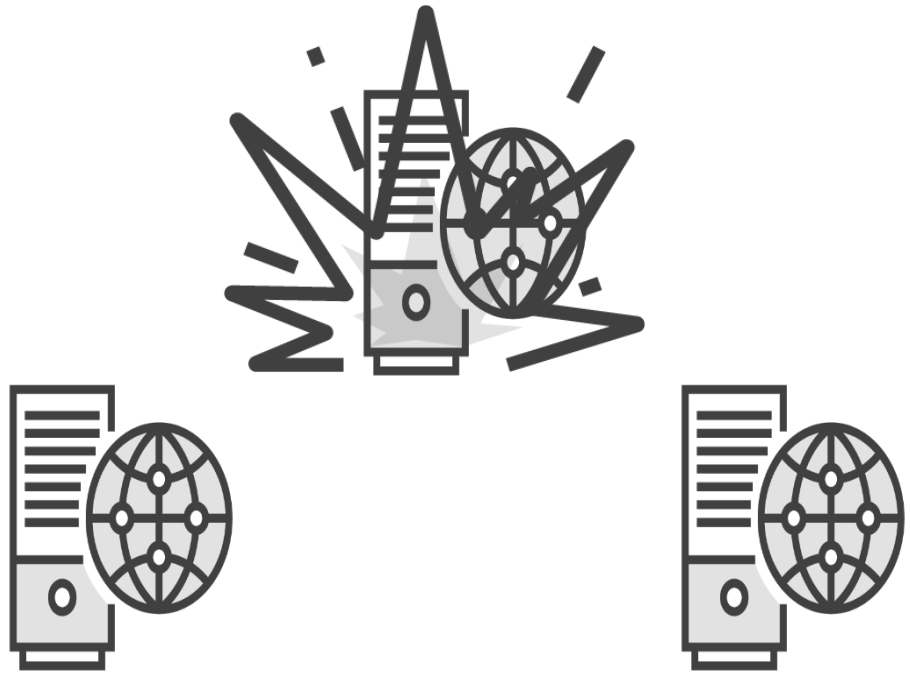
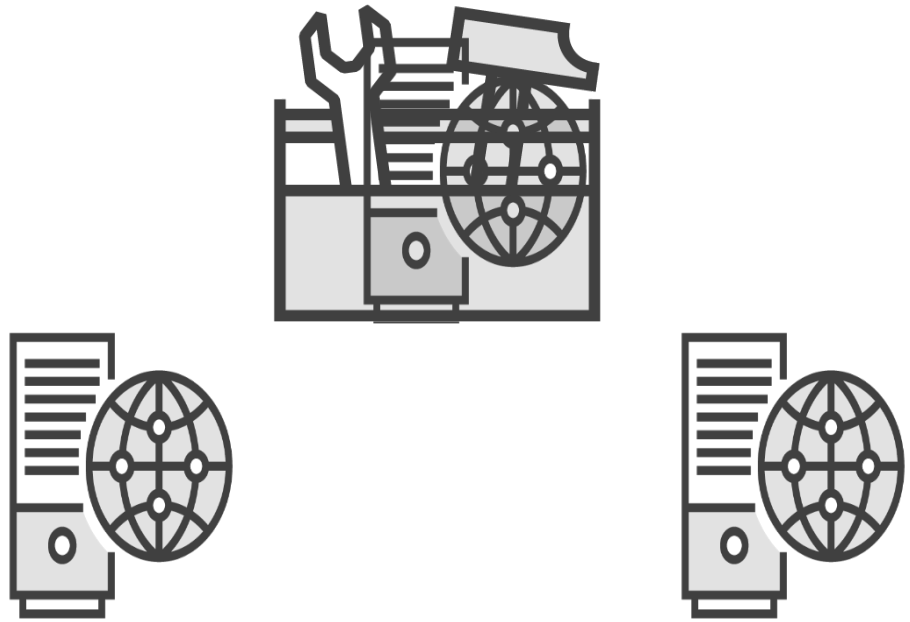
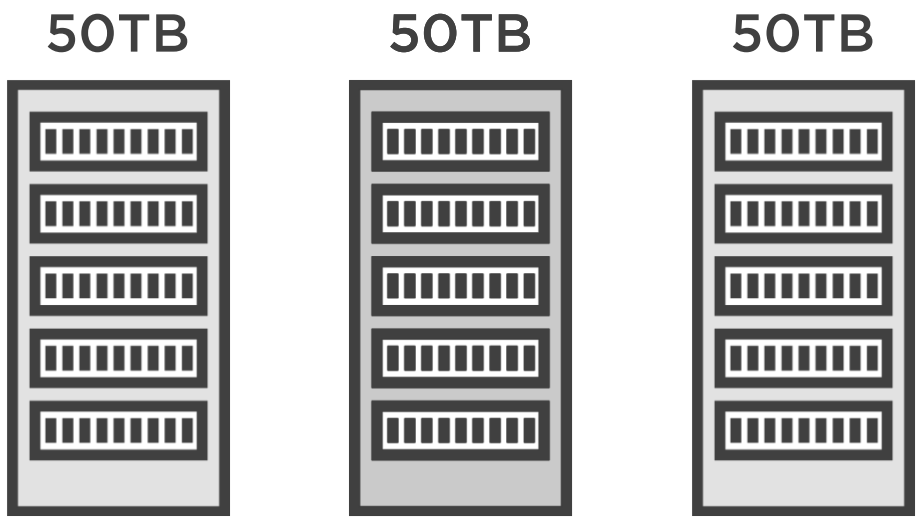


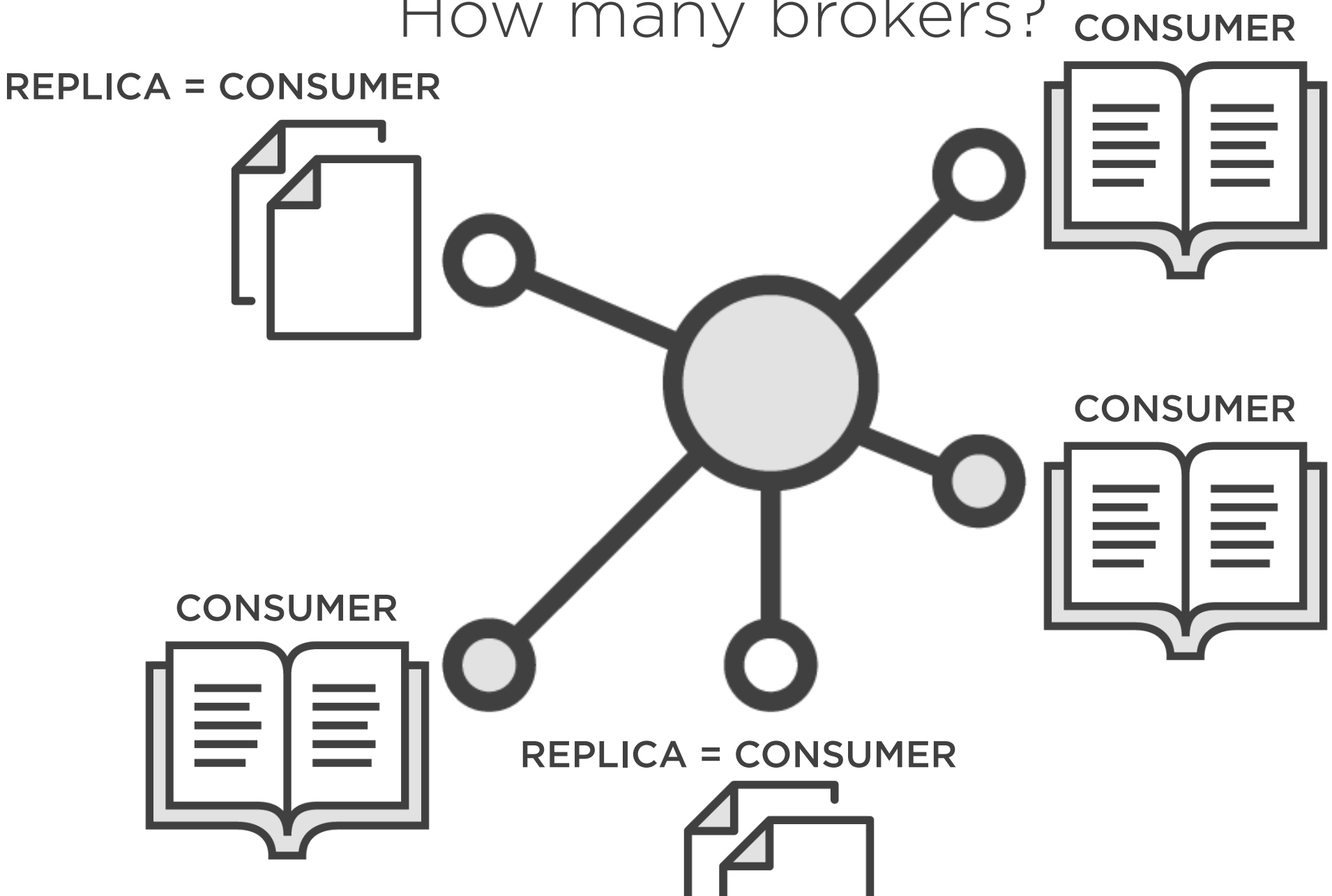


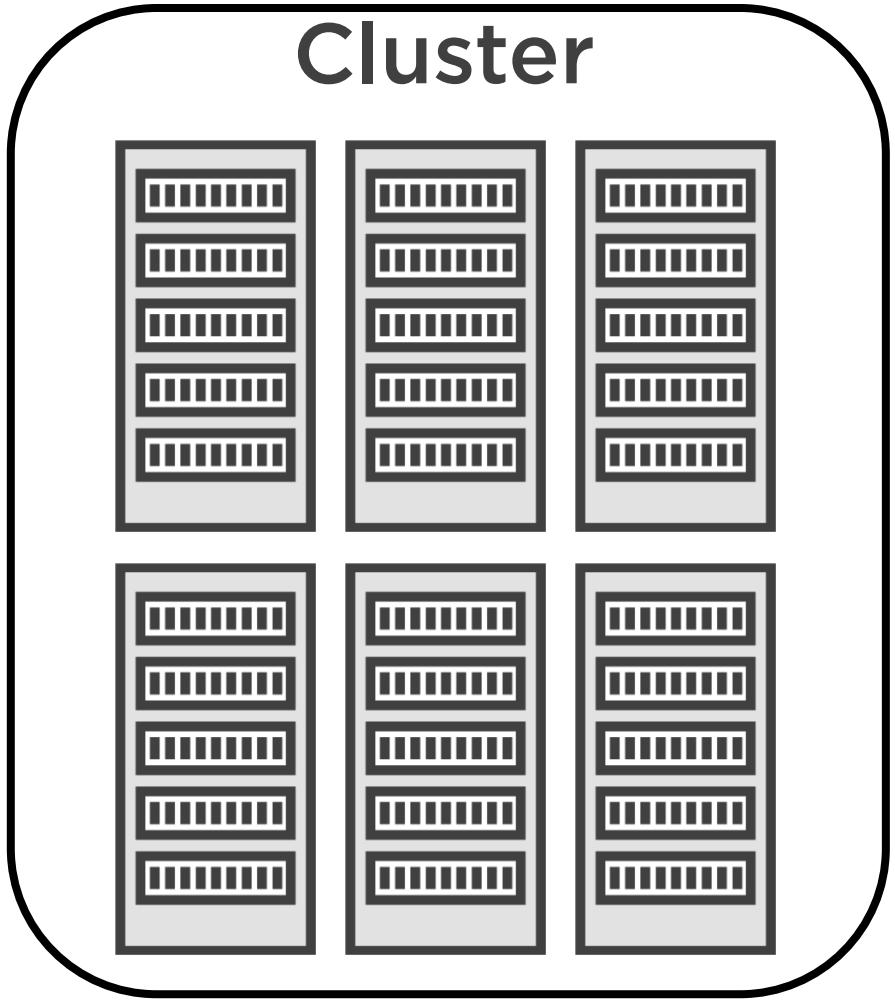
How many brokers?

How many brokers?



How many brokers?

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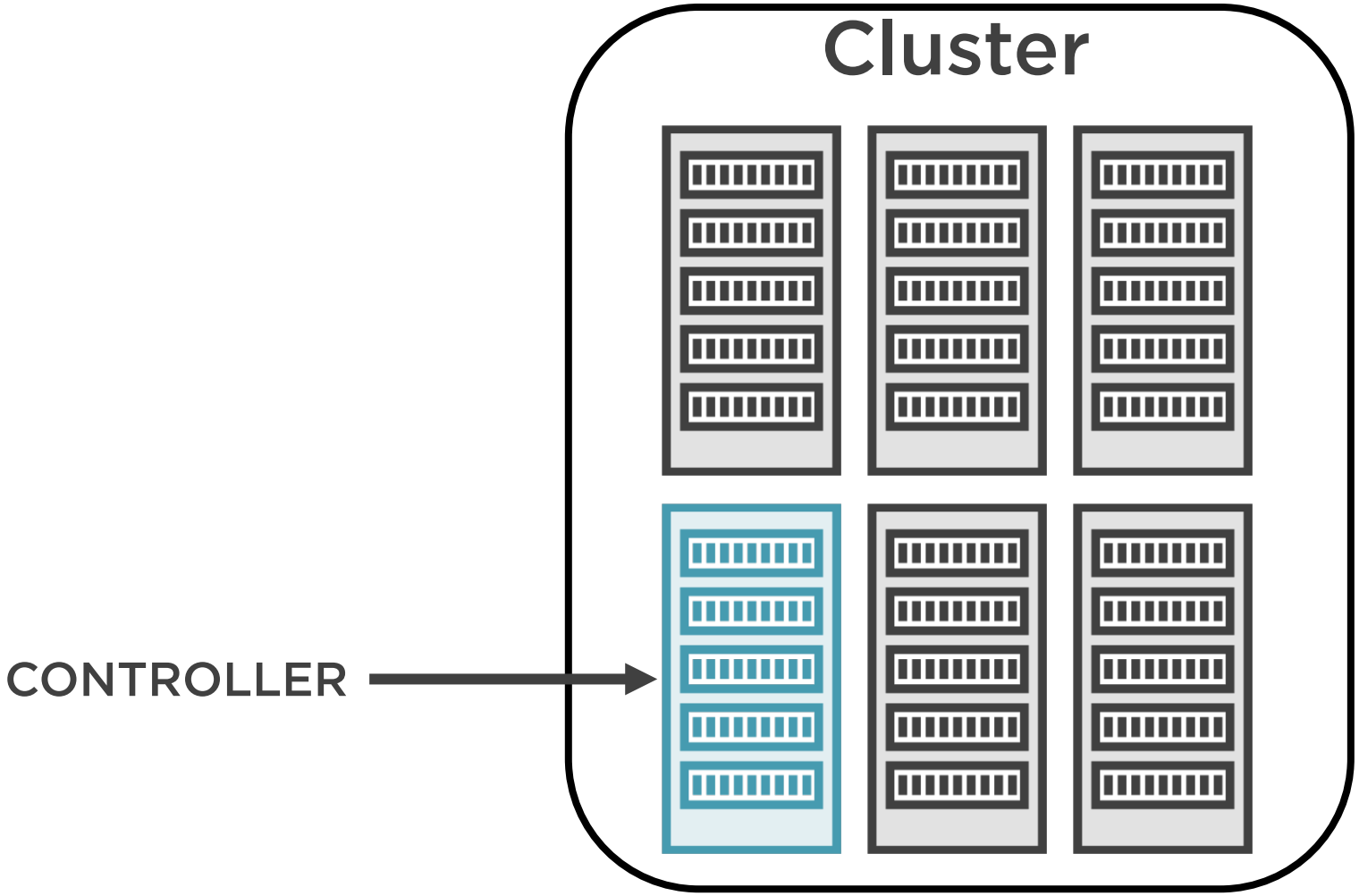
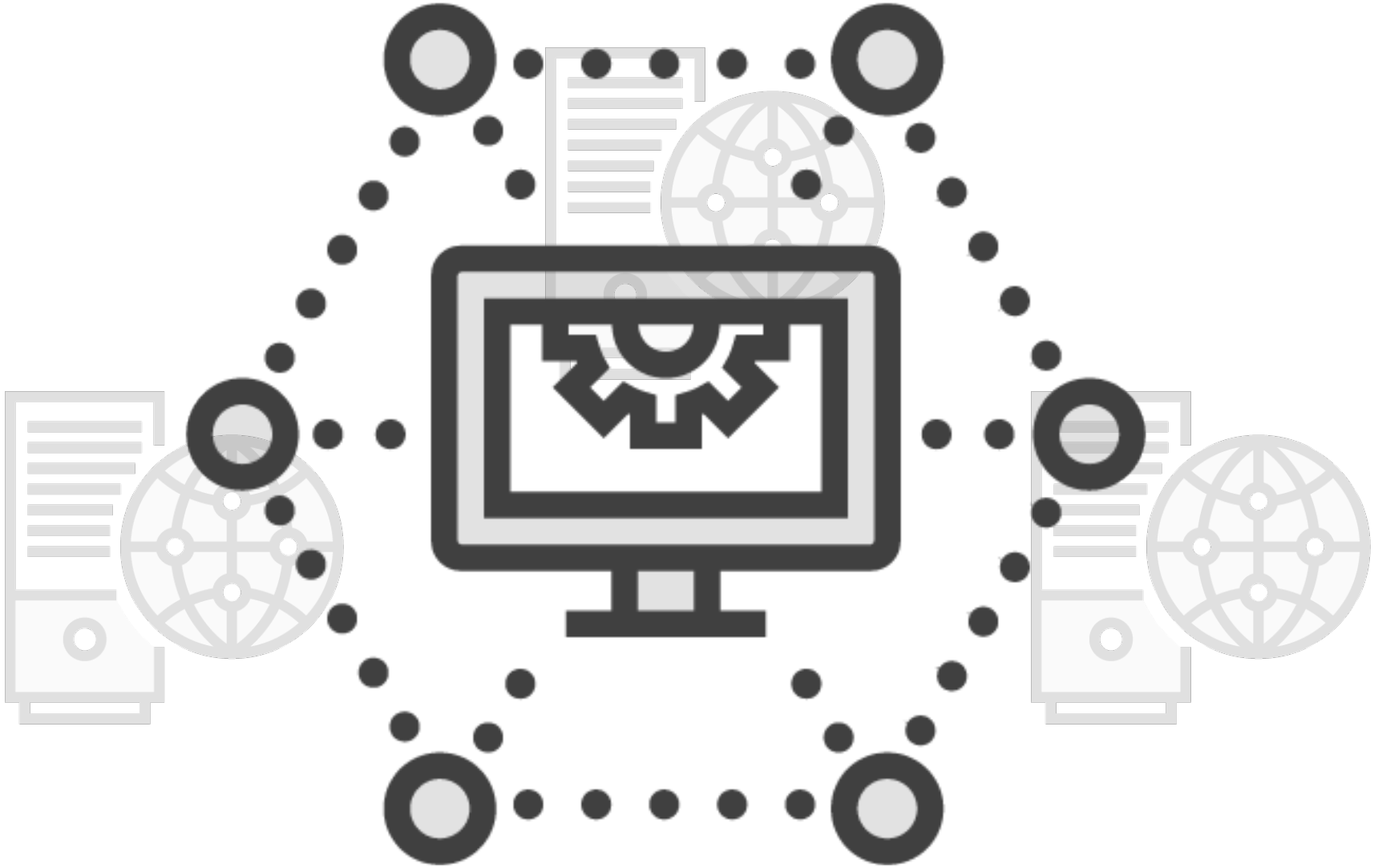

Cluster
CONTROLLER

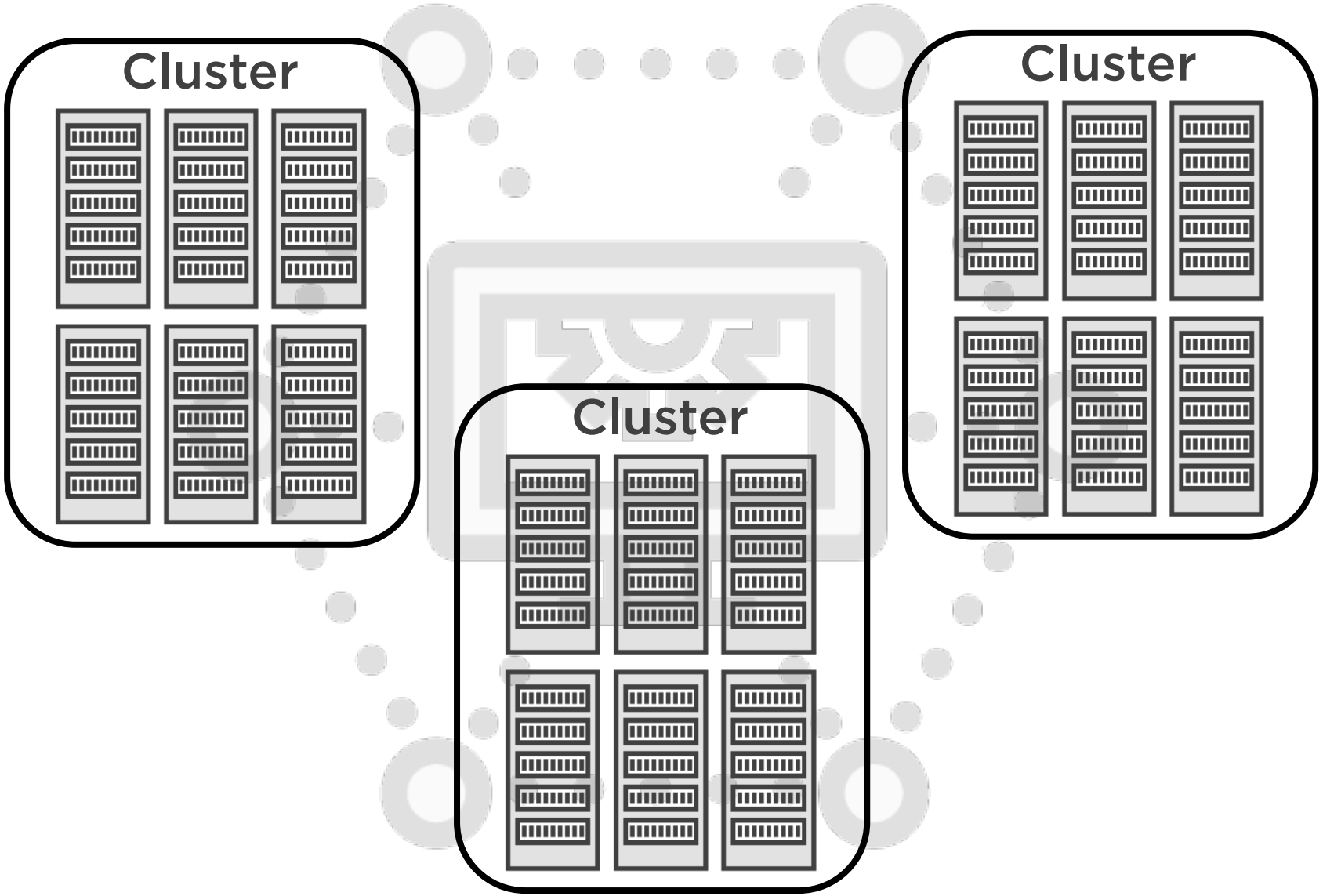
Kafka's Failure Manager: ZooKeeper

Apache ZooKeeper



Apache ZooKeeper

Apache ZooKeeper



Apache ZooKeeper

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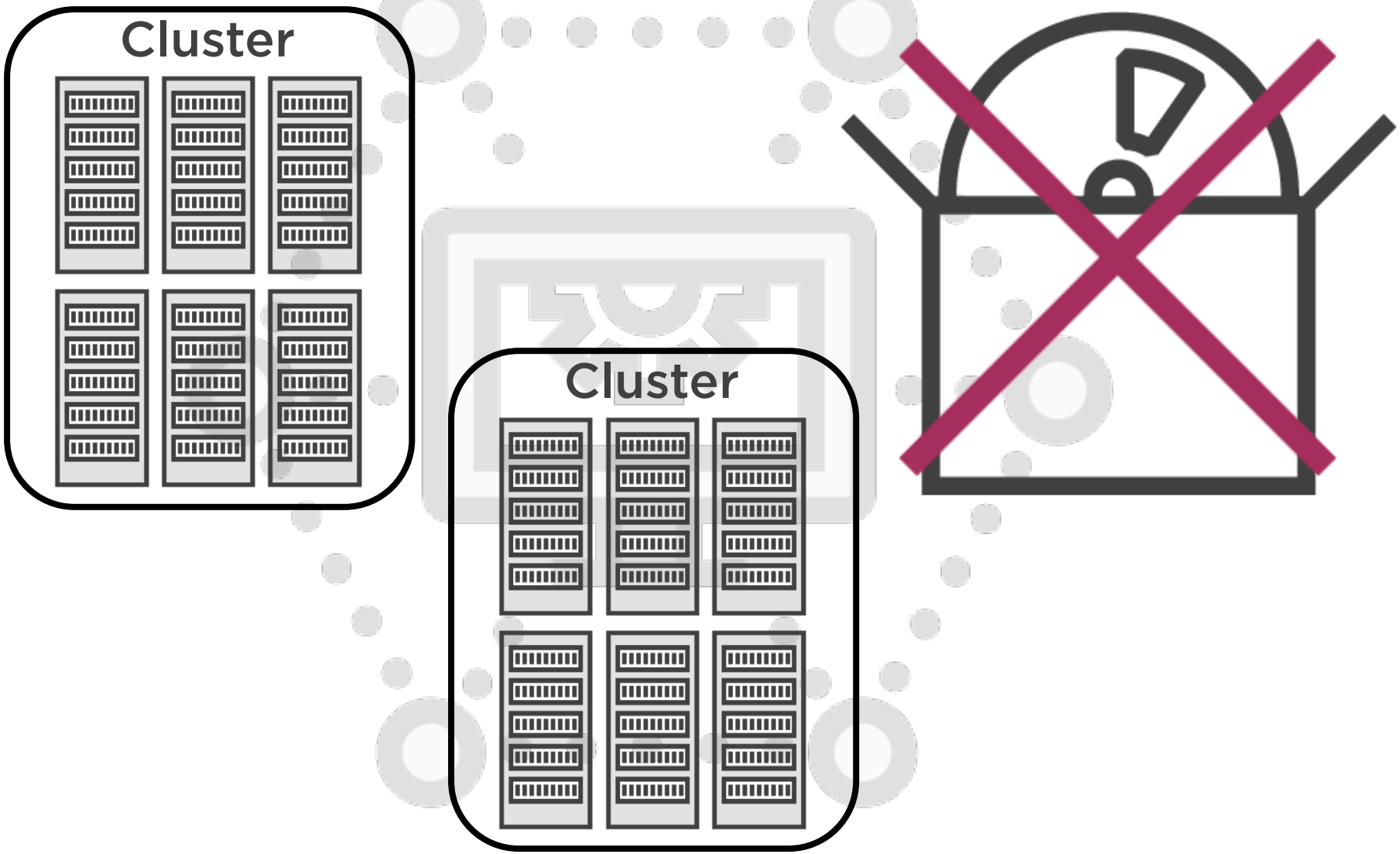
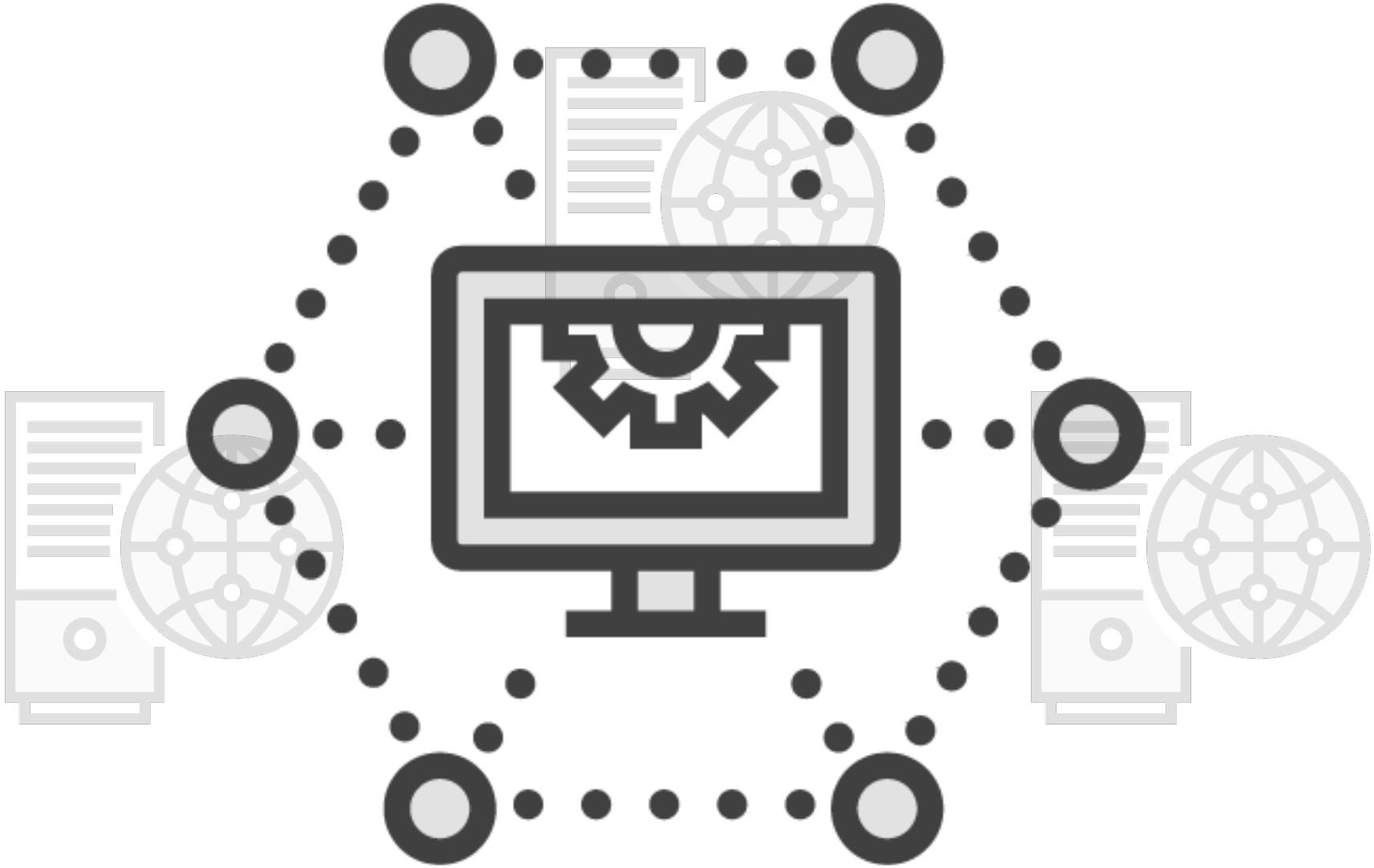
chroot

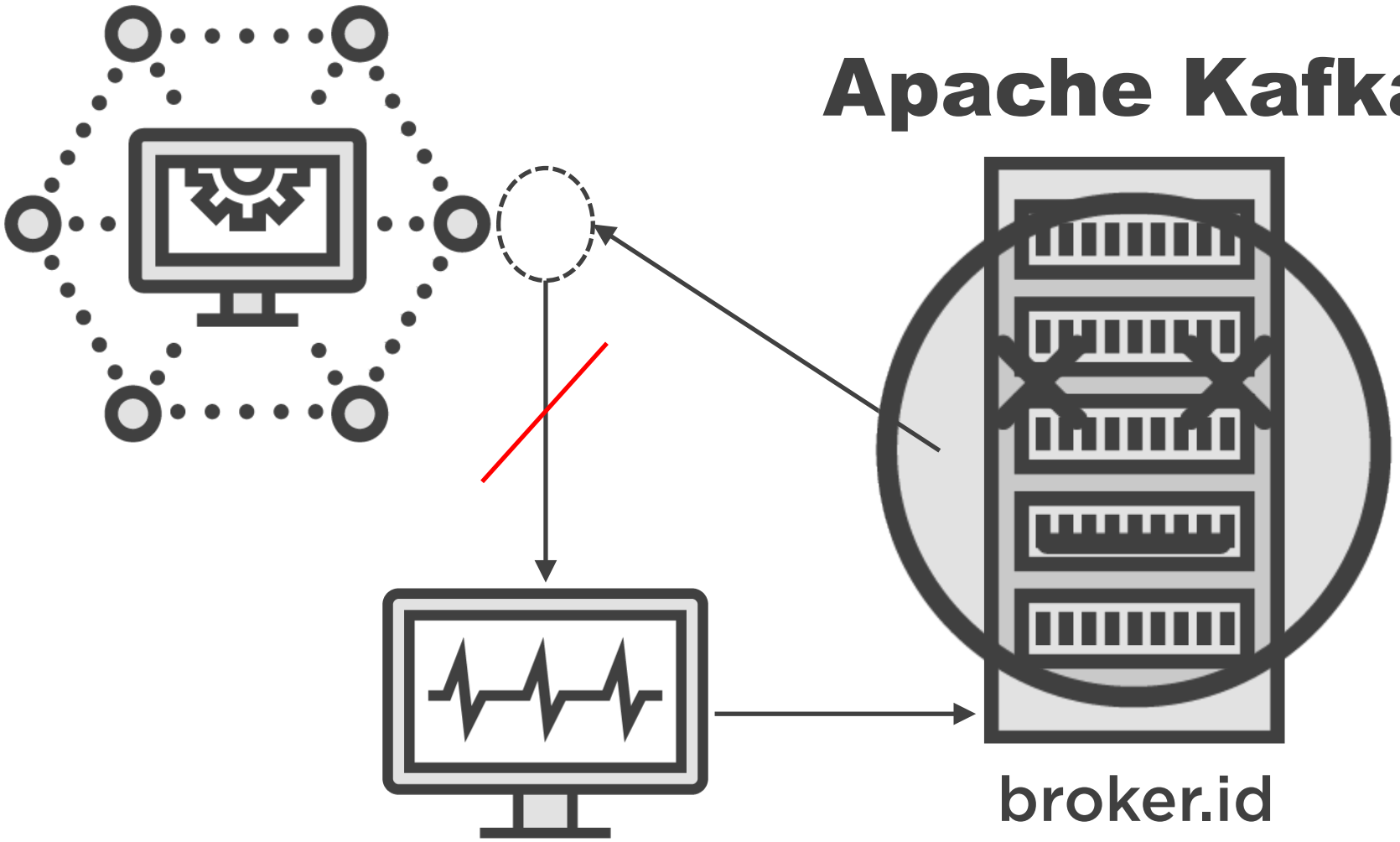
Apache ZooKeeper



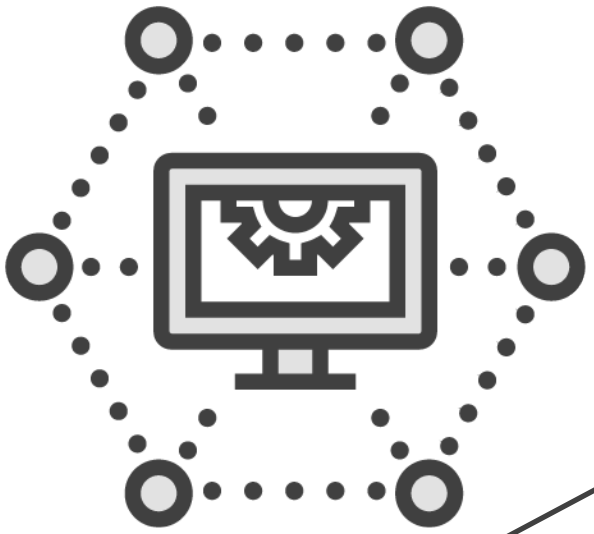
Apache ZooKeeper



Apache ZooKeeper

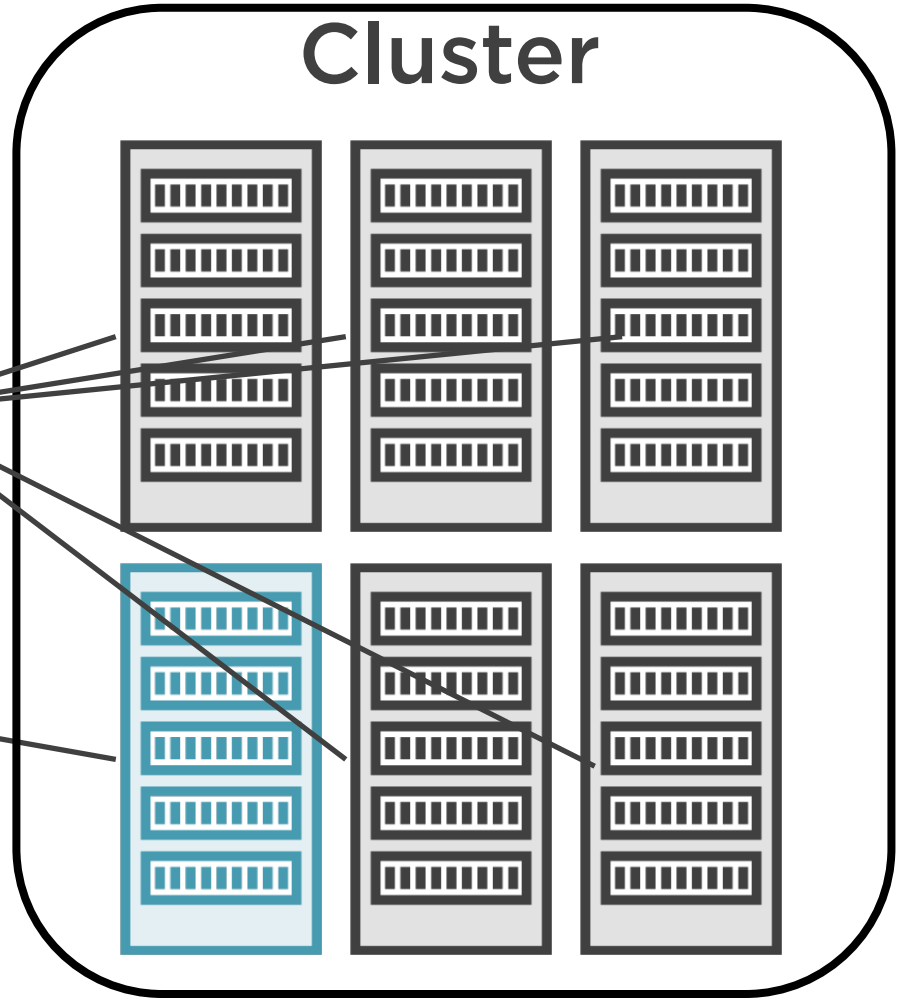


Apache ZooKeeper



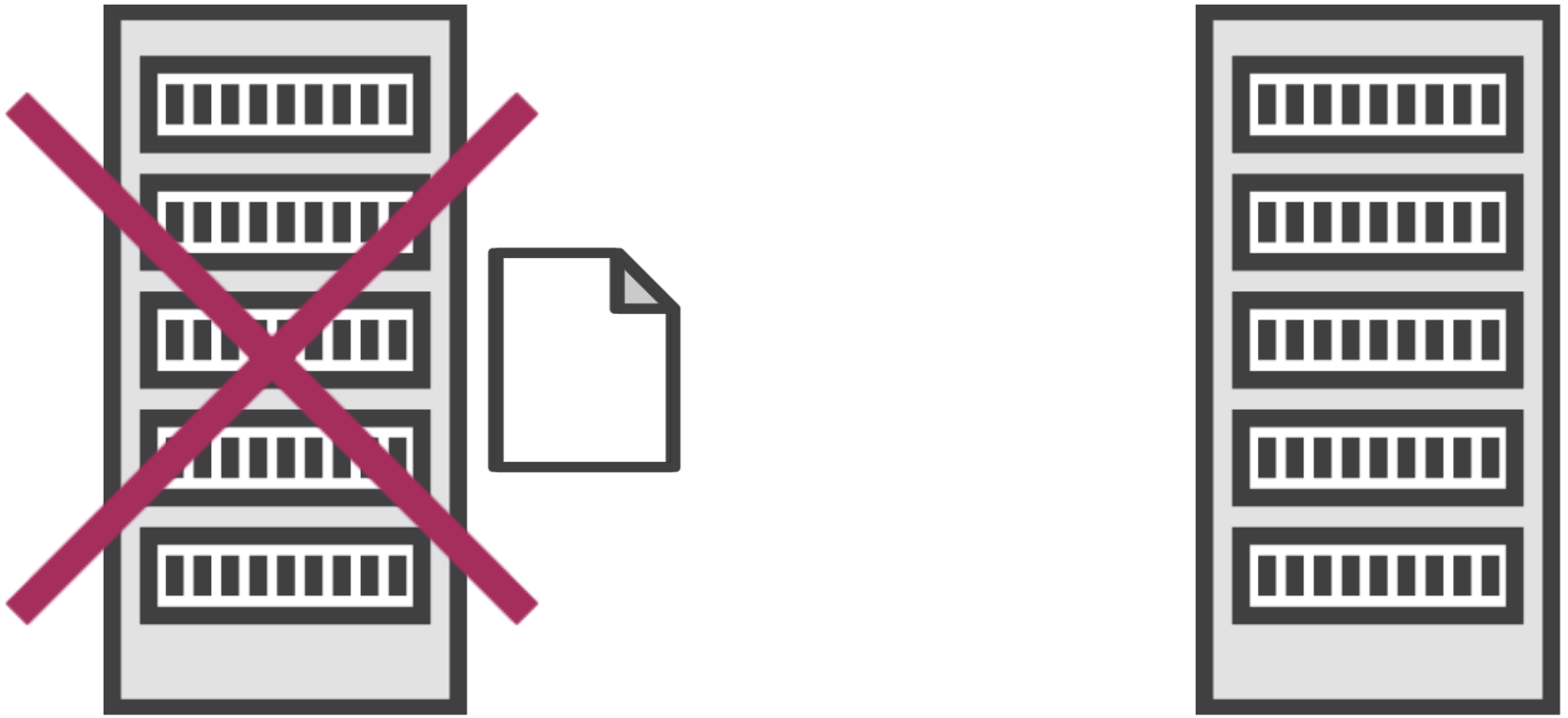
/controller

Apache Kafka



Keeping the data alive!
Data Fault Tolerance

Replication



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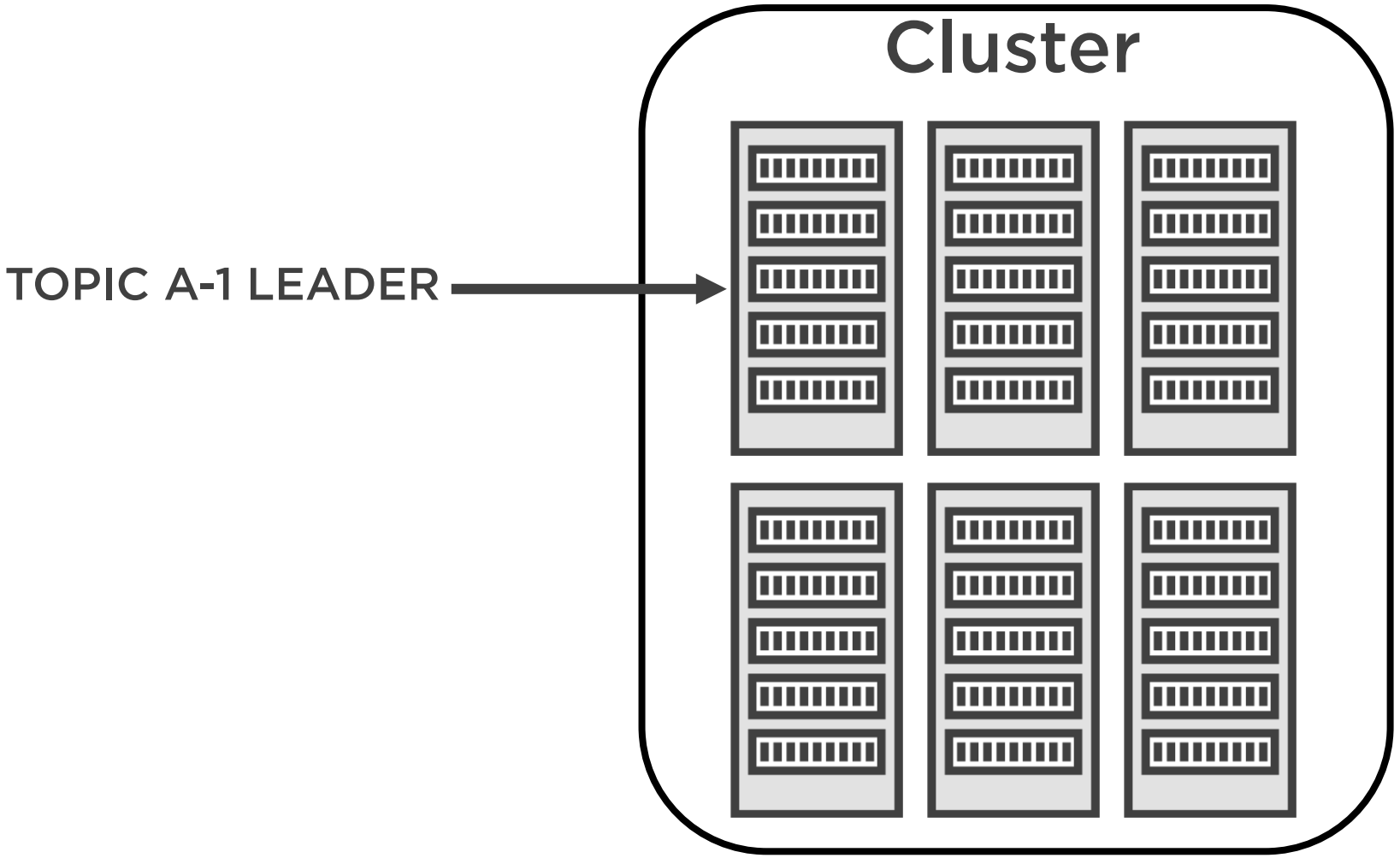

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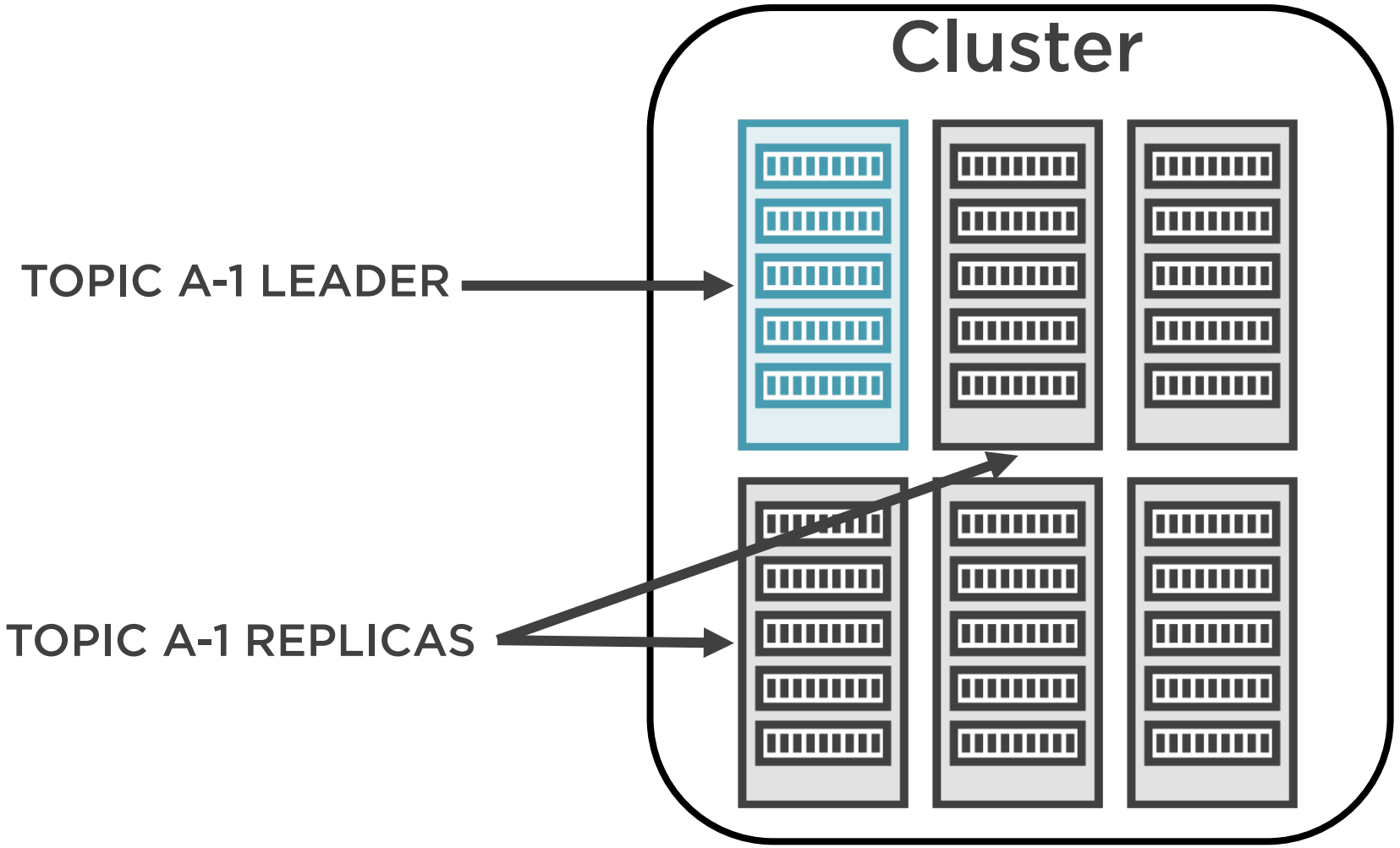

Replication

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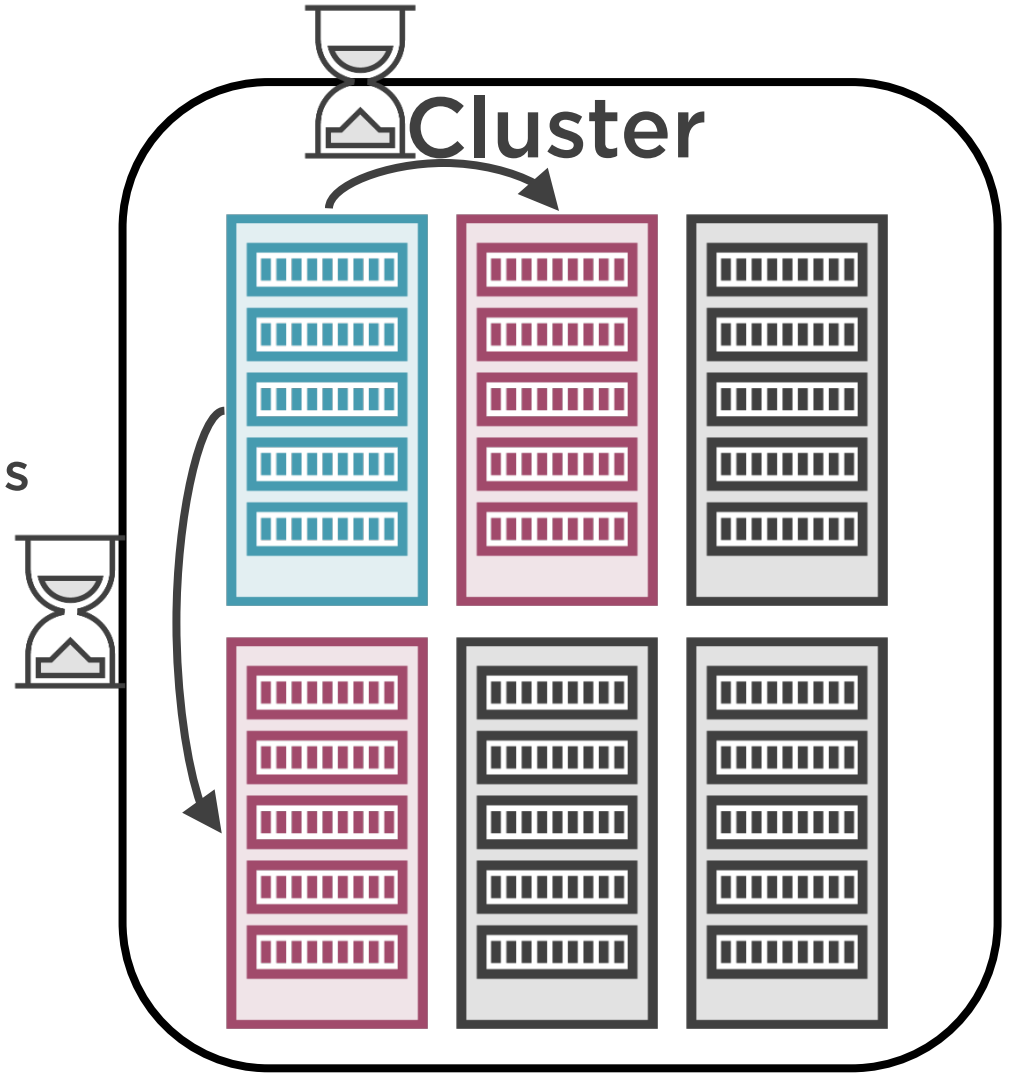

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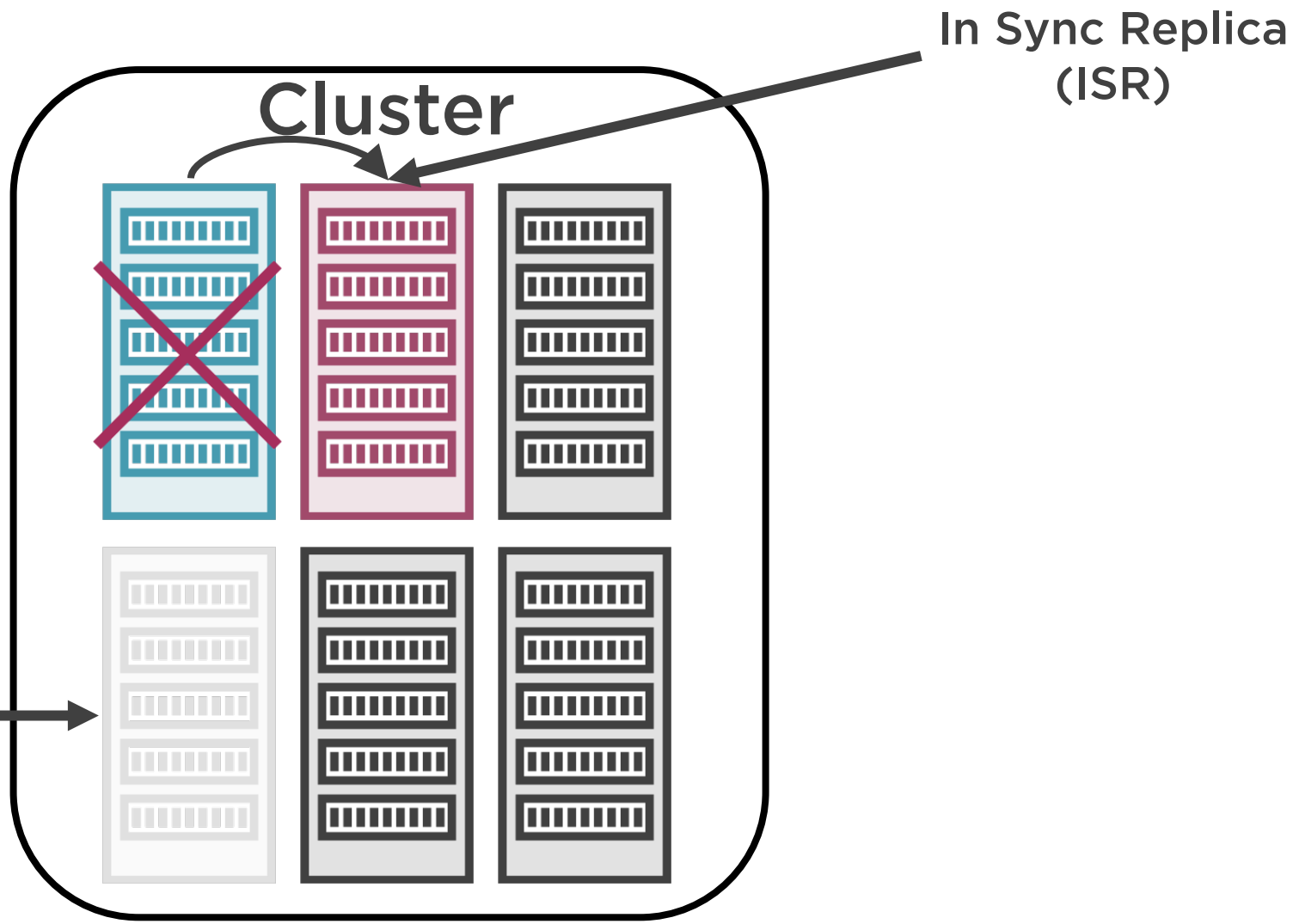

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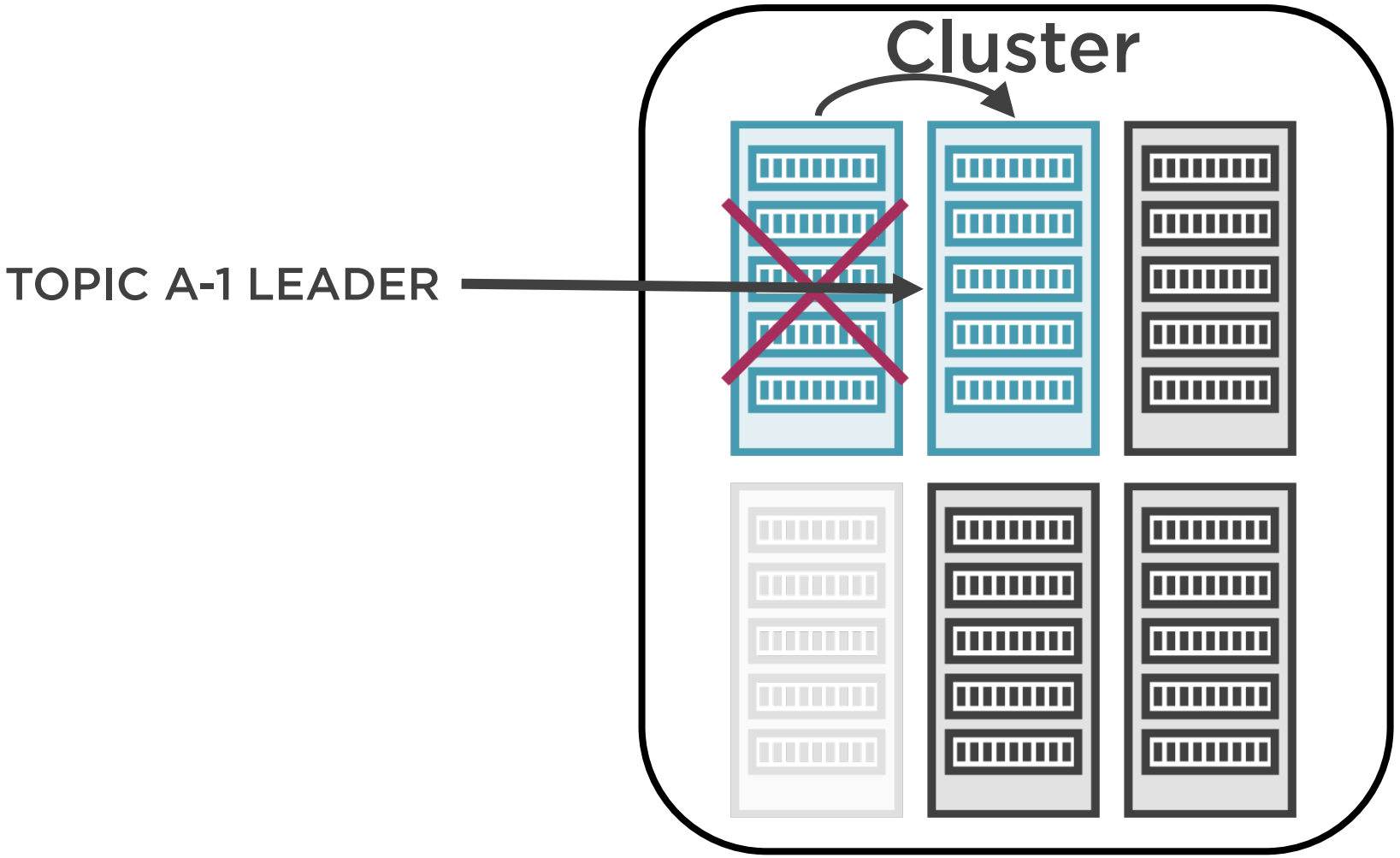

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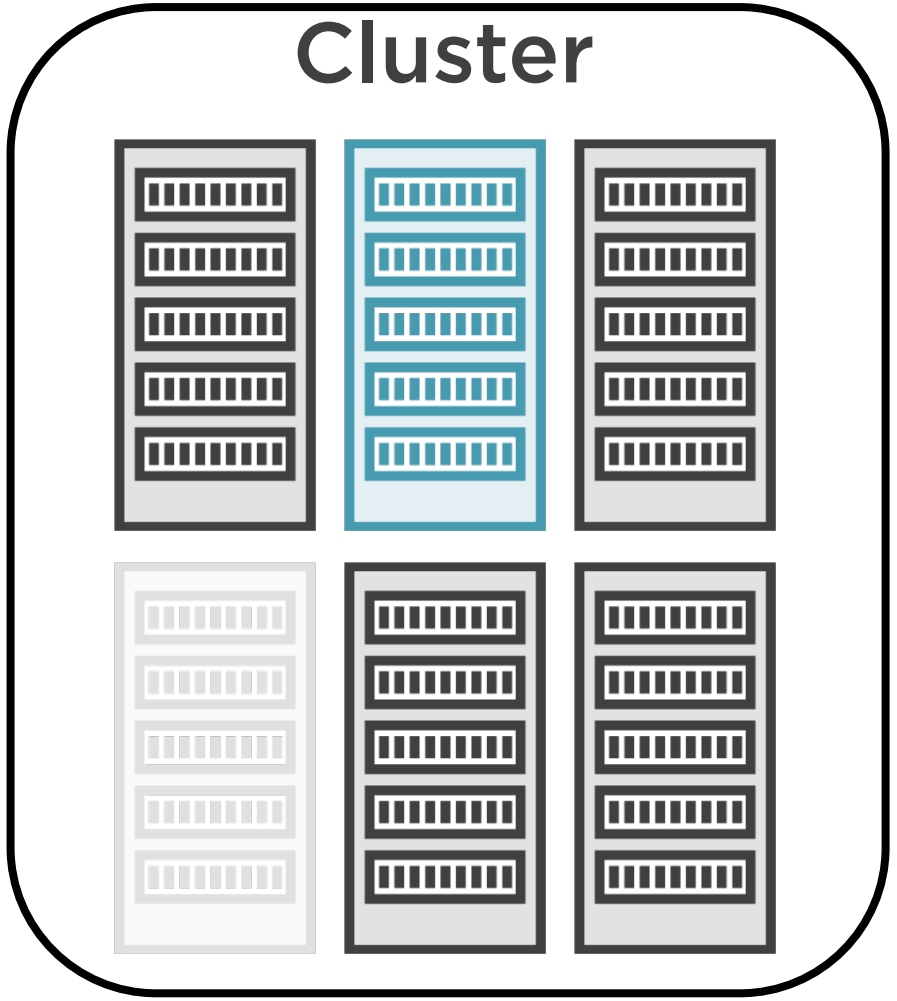

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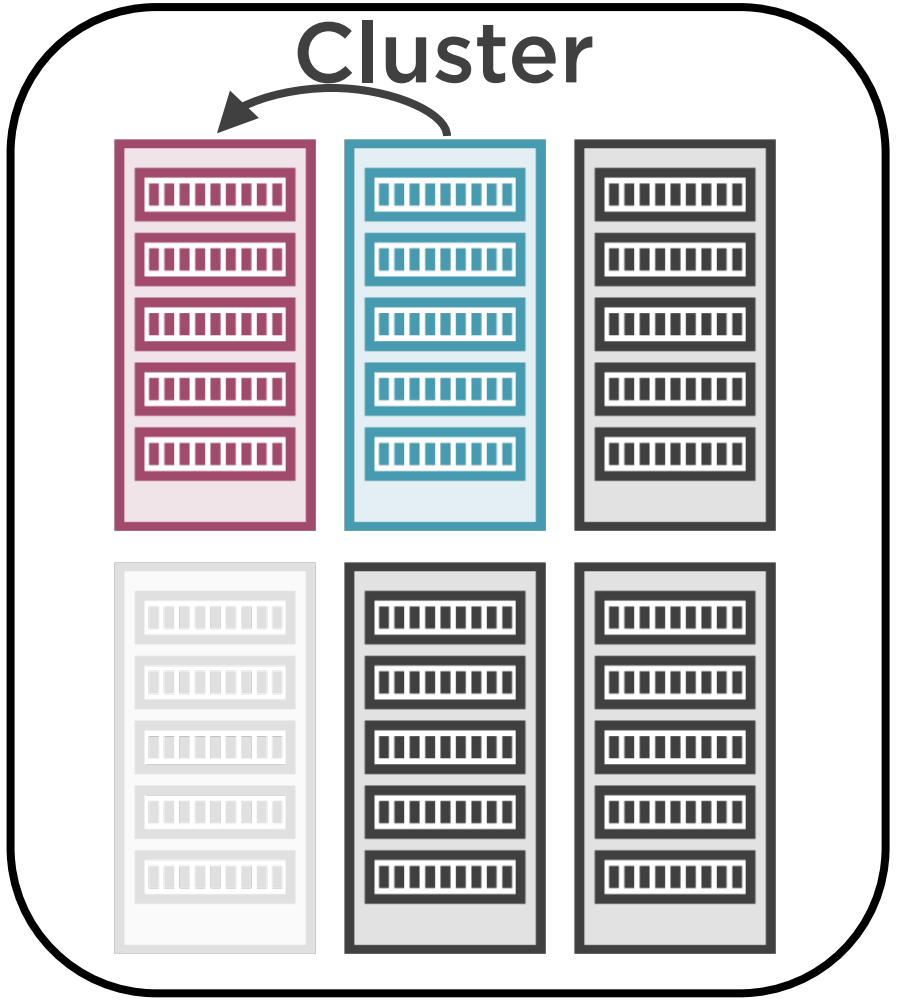
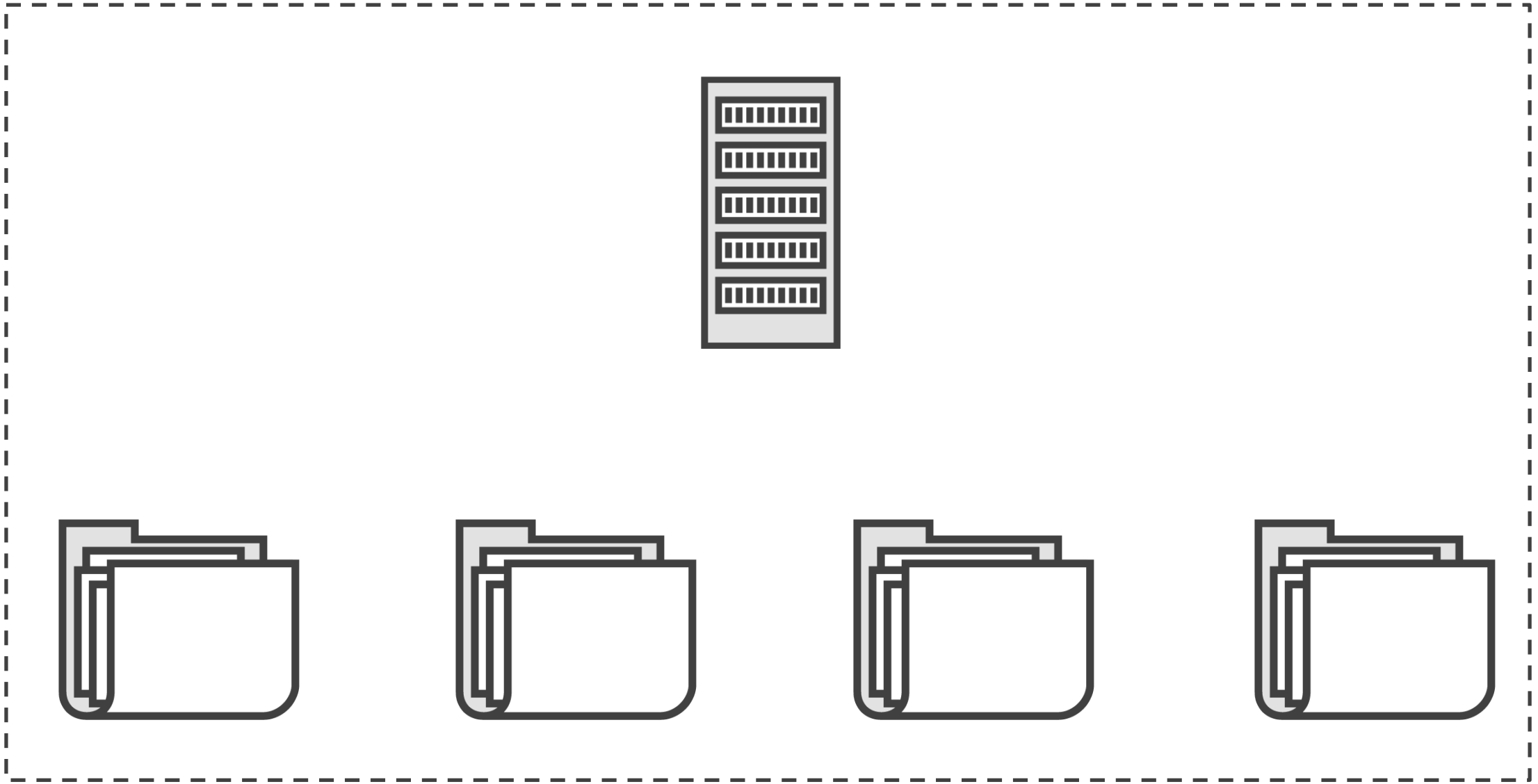
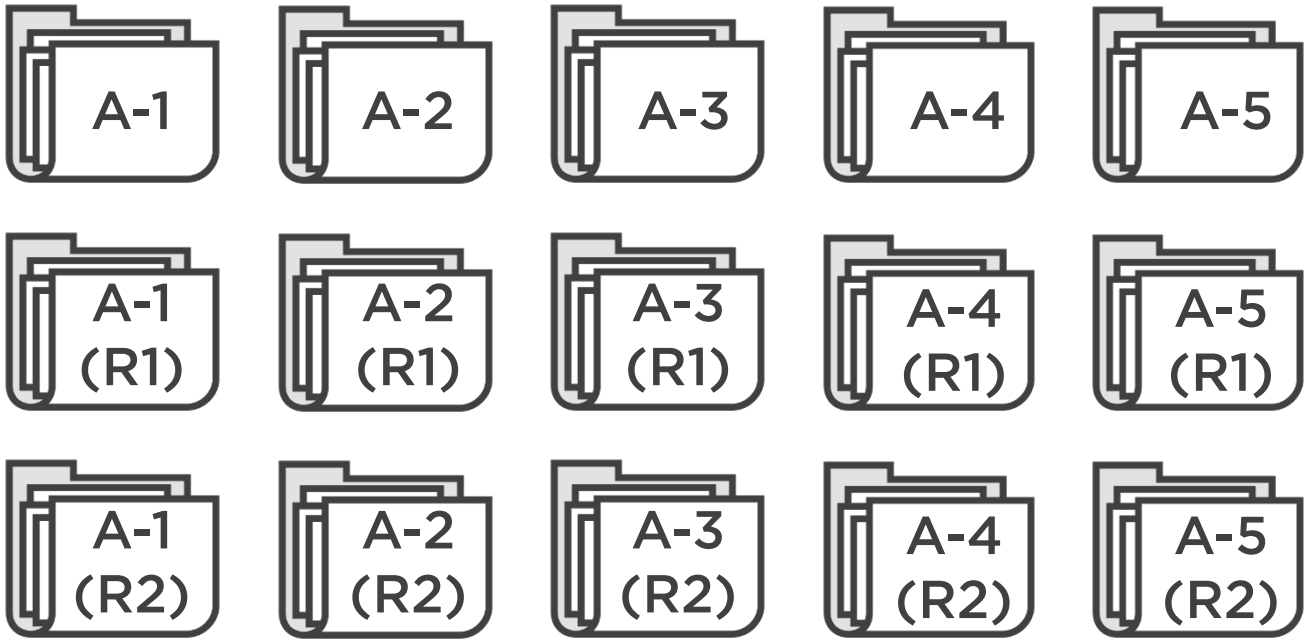
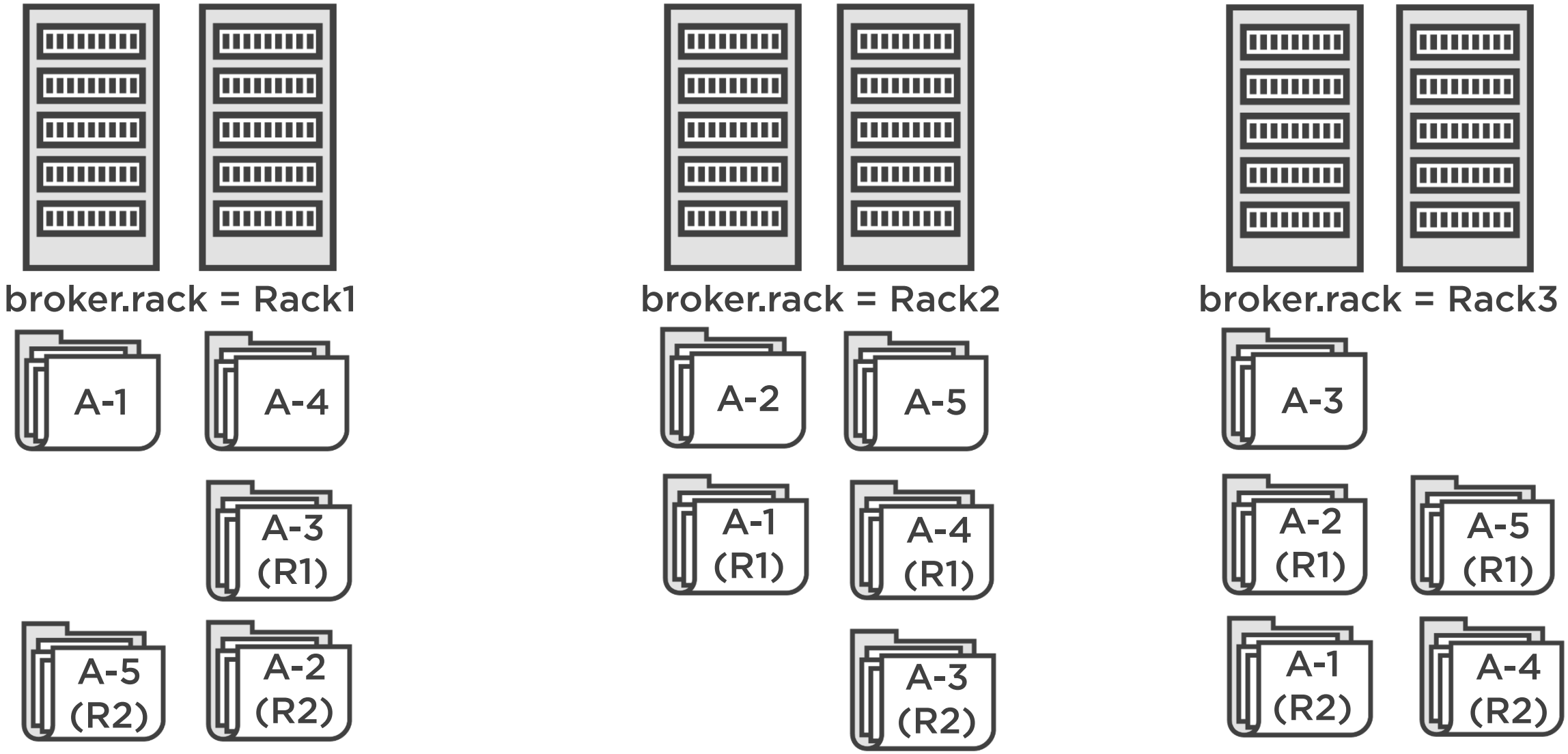


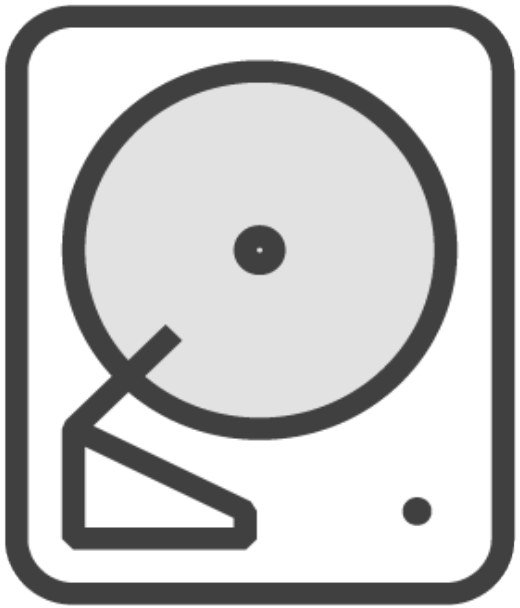
Data Management



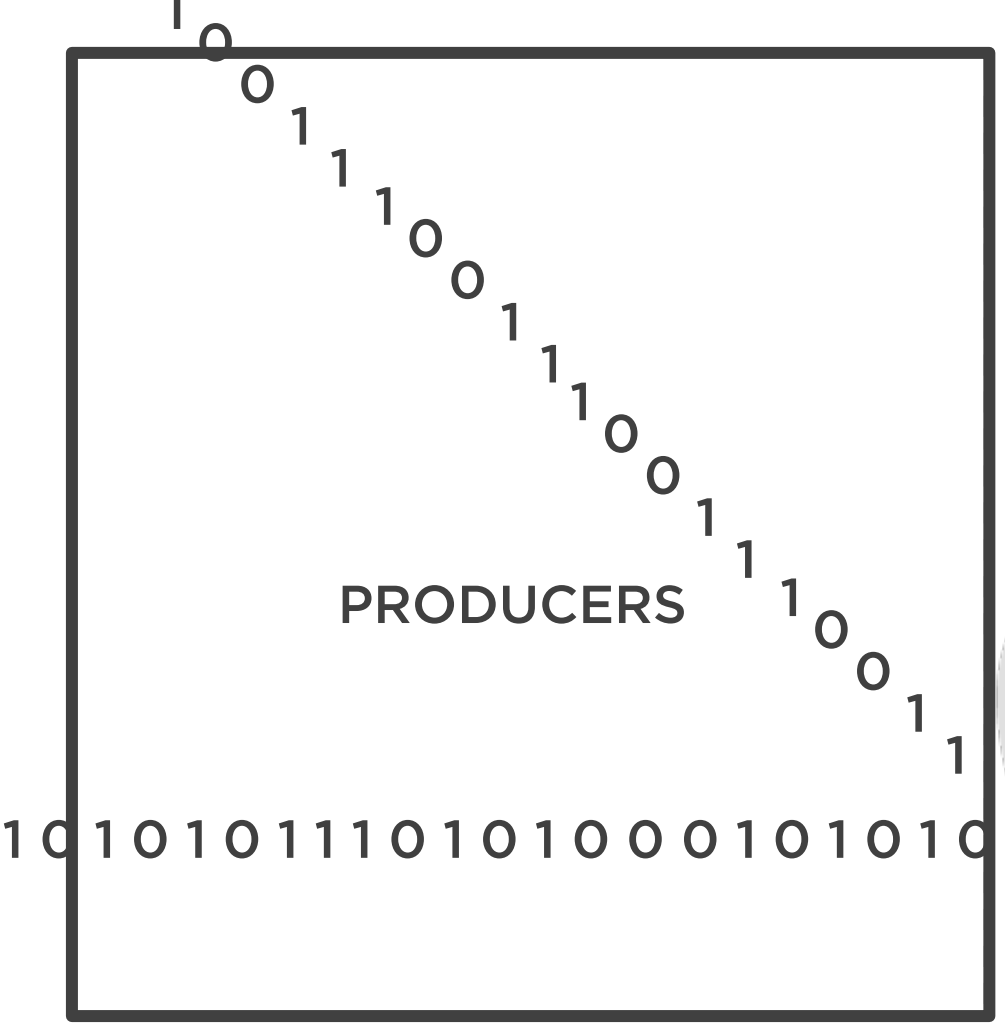

A-1
A-2
A-3
A-4
A-5
A-1 (R1)
A-2 (R1)
A-3 (R1)
A-4 (R1)
A-5 (R1)
A-1 (R2)
A-2 (R2)
A-3 (R2)
A-4 (R2)
A-5 (R2)

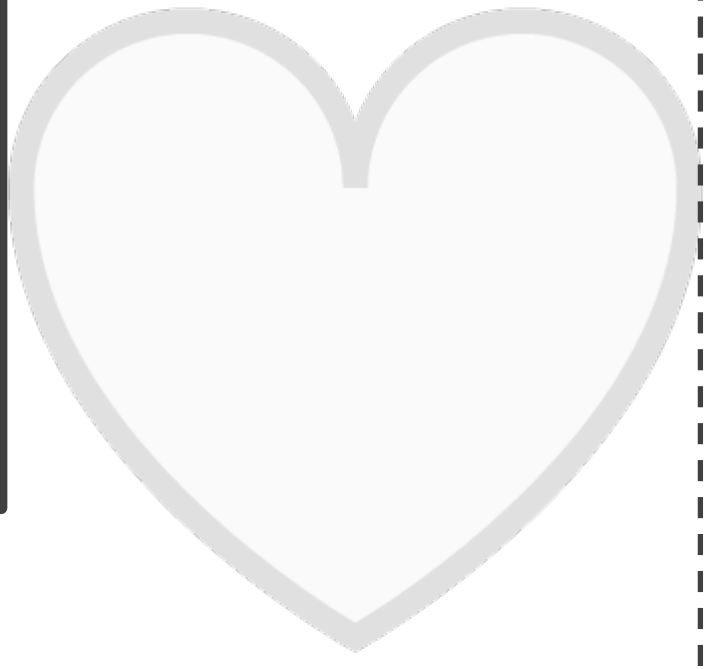

broker.rack = Rack1
broker.rack = Rack2
broker.rack = Rack3
A-1
A-4
A-3 (R1)
A-5 (R2)
A-2 (R2)
A-2
A-5
A-1 (R1)
A-4 (R1)
A-3 (R2)
A-3
A-2 (R1)
A-5 (R1)
A-1 (R2)
A-4 (R2)

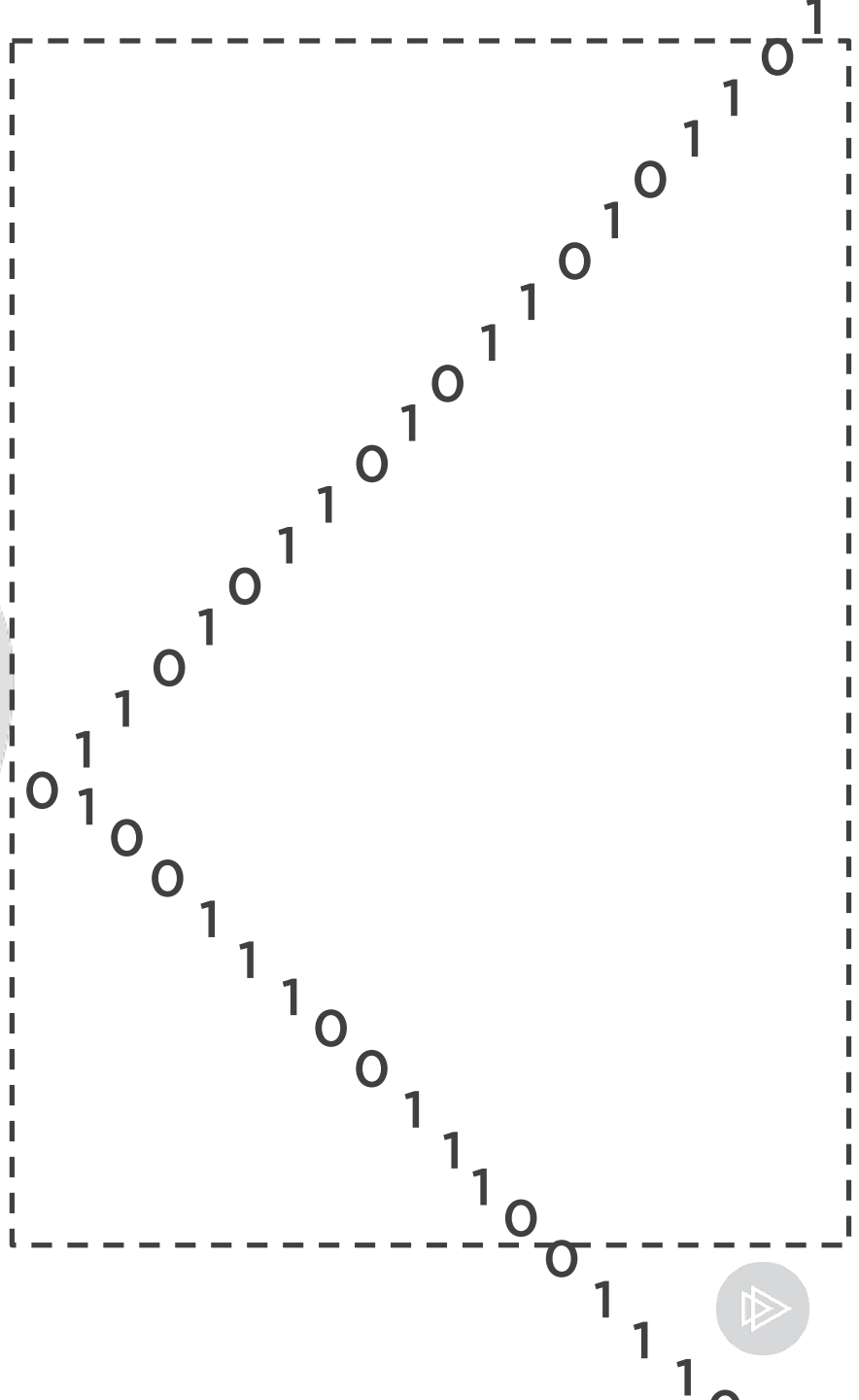
Data Retention



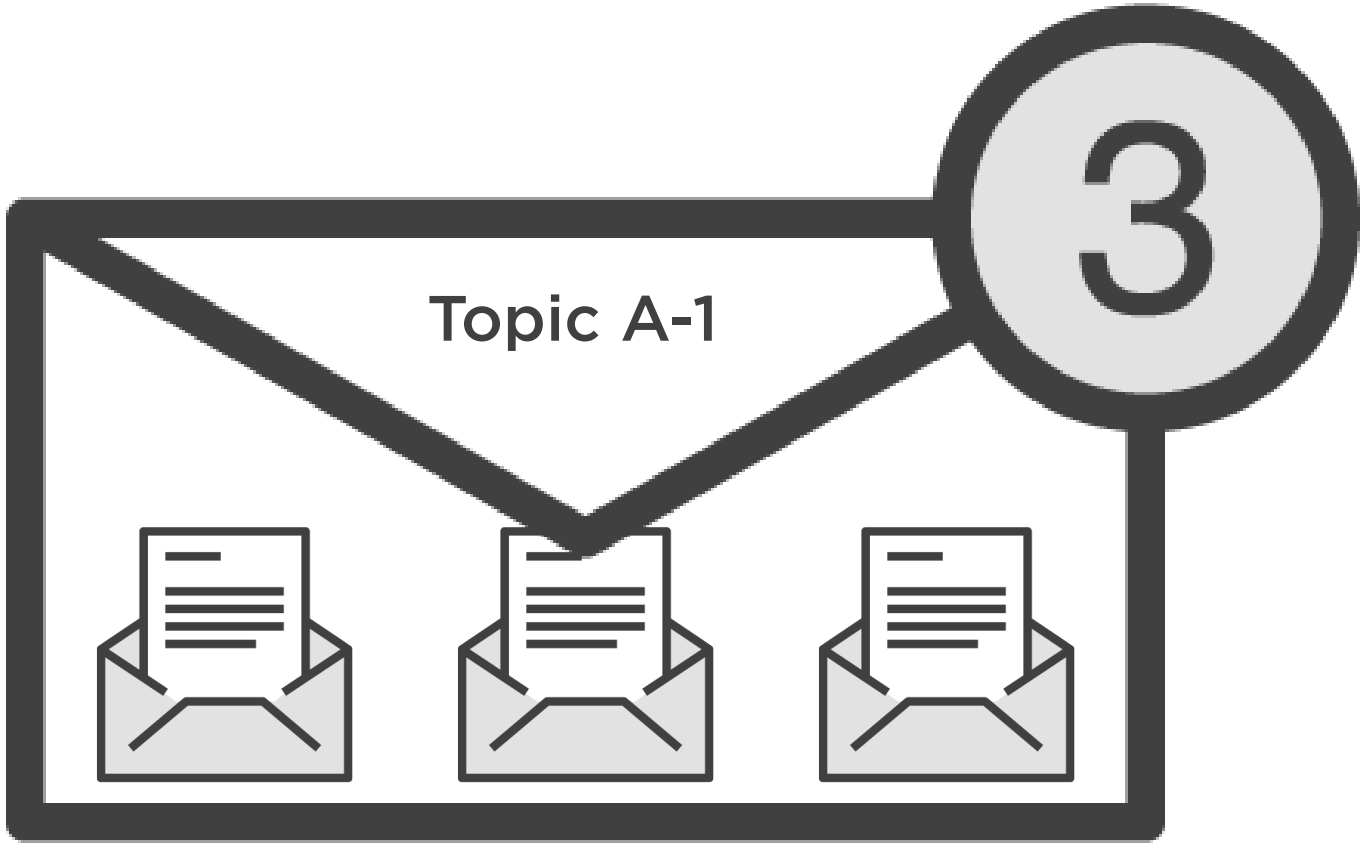
Kafka's Flow: Consumers & Producers


PRODUCERS
1 0 1 0 1 0 1 1 1 0 1 0 1 0 0 0 1 0 1 0 1 0

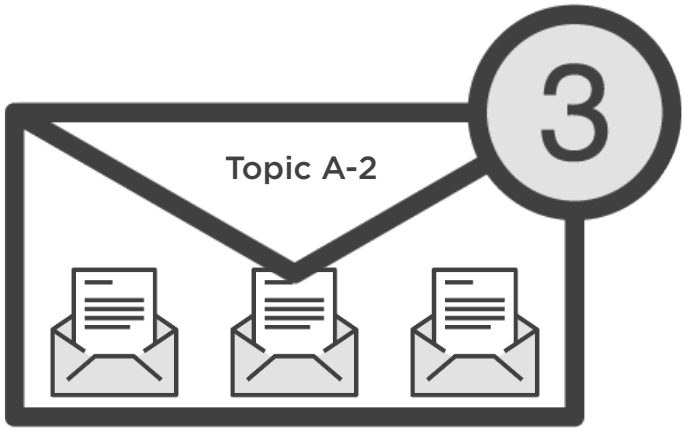


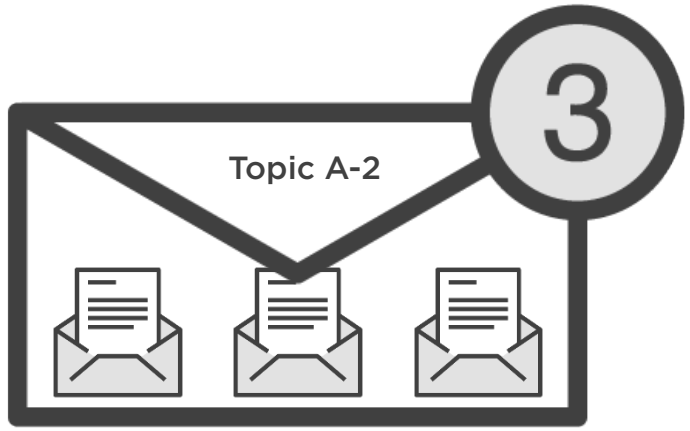


Producers



Producers

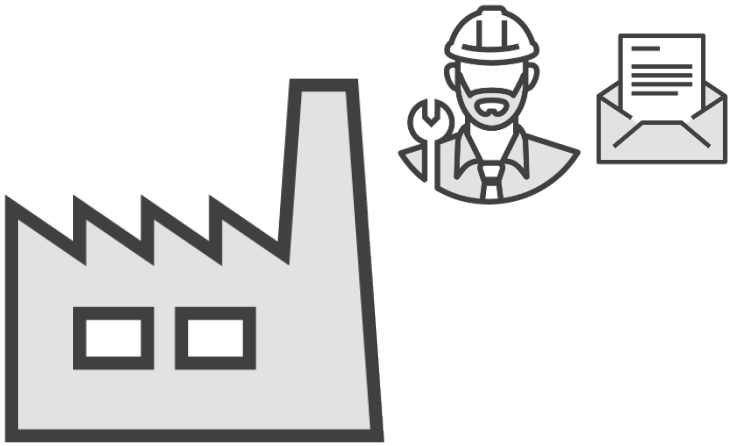




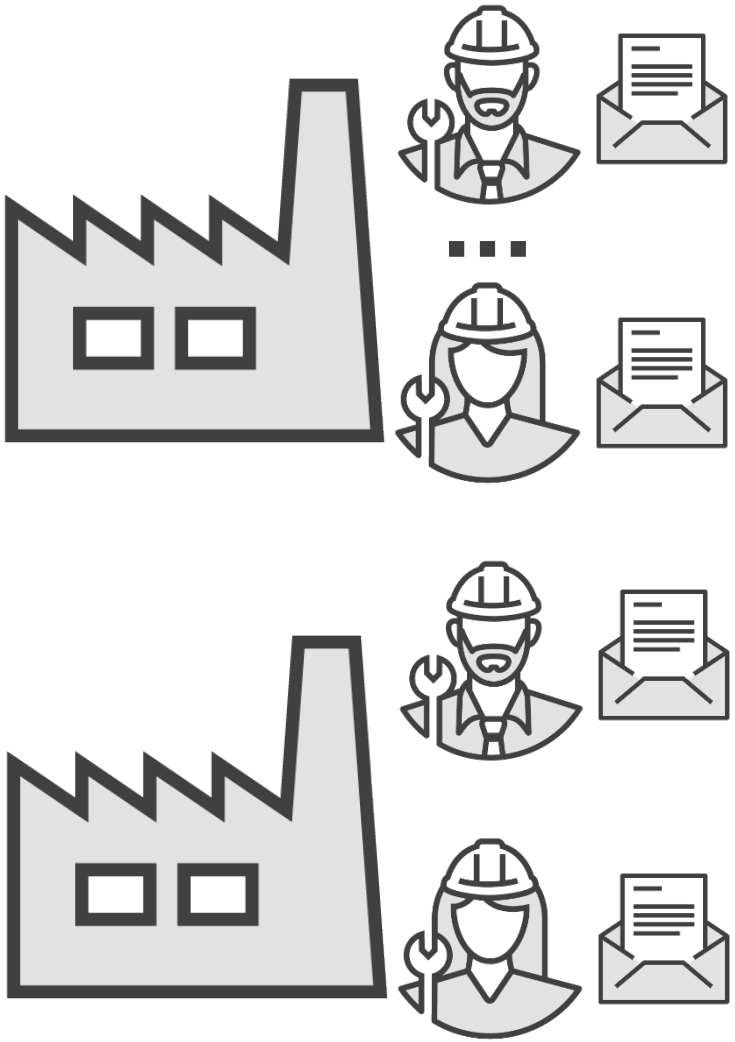
Producers

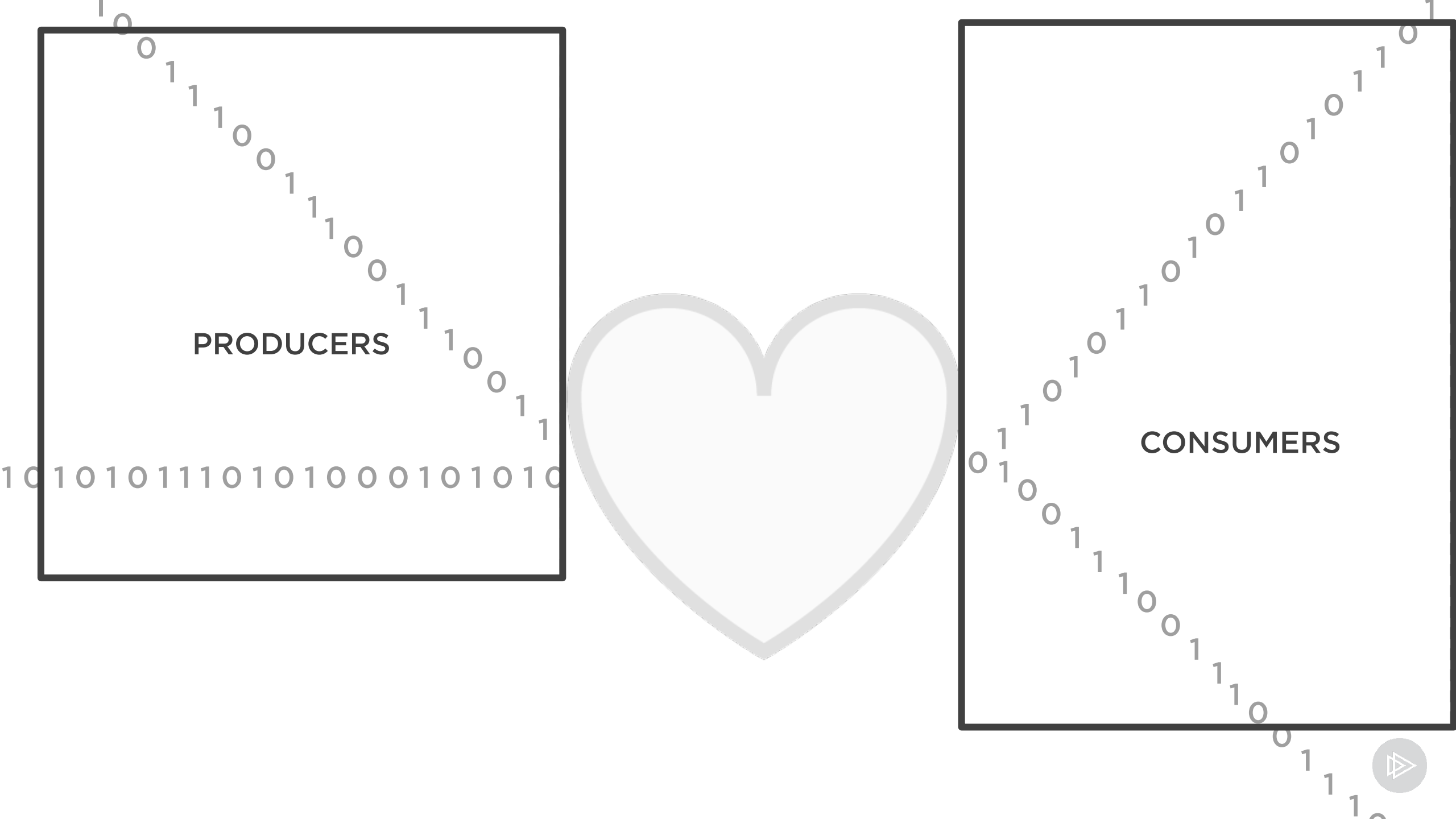
Topic A-?

Producers

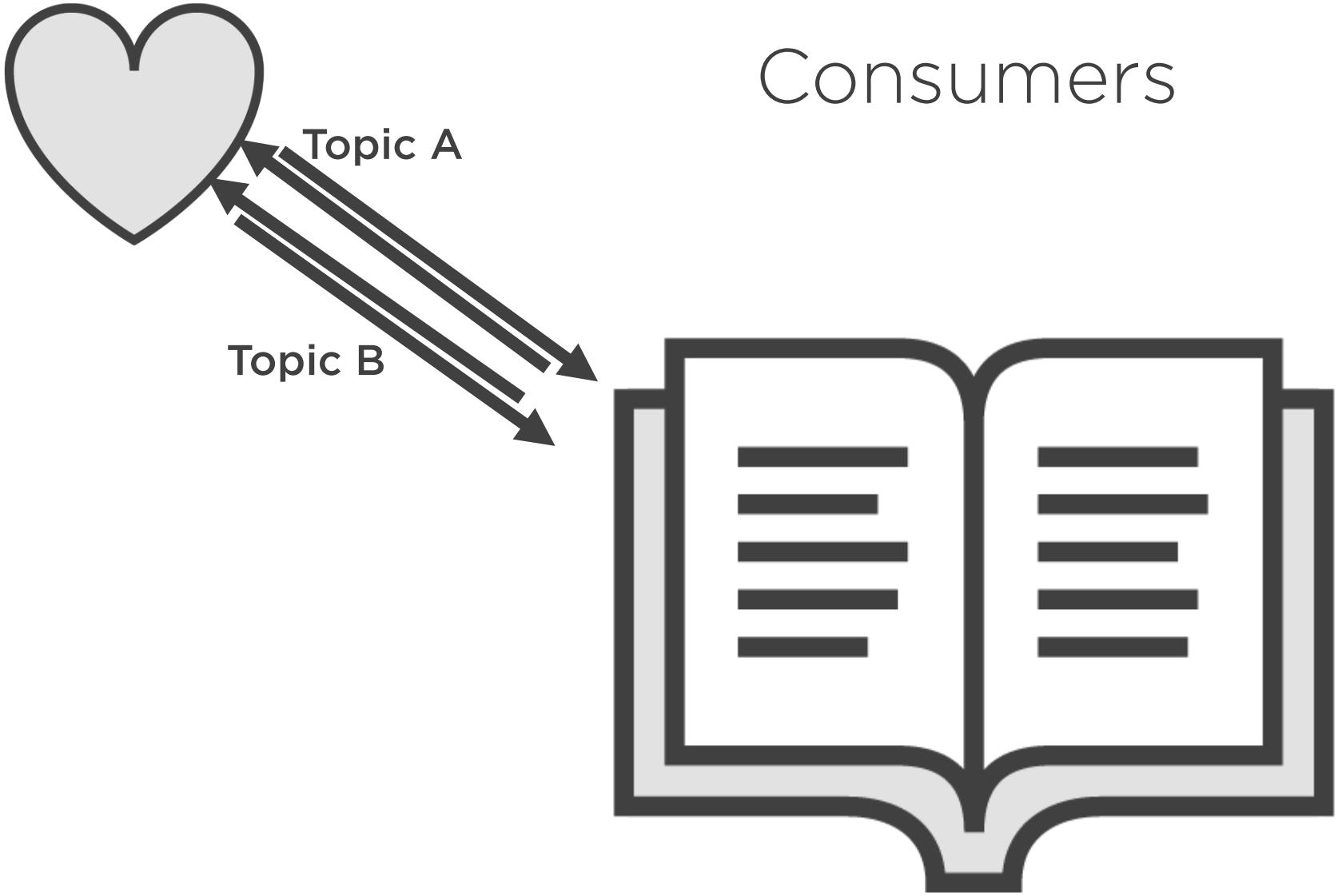


Producers

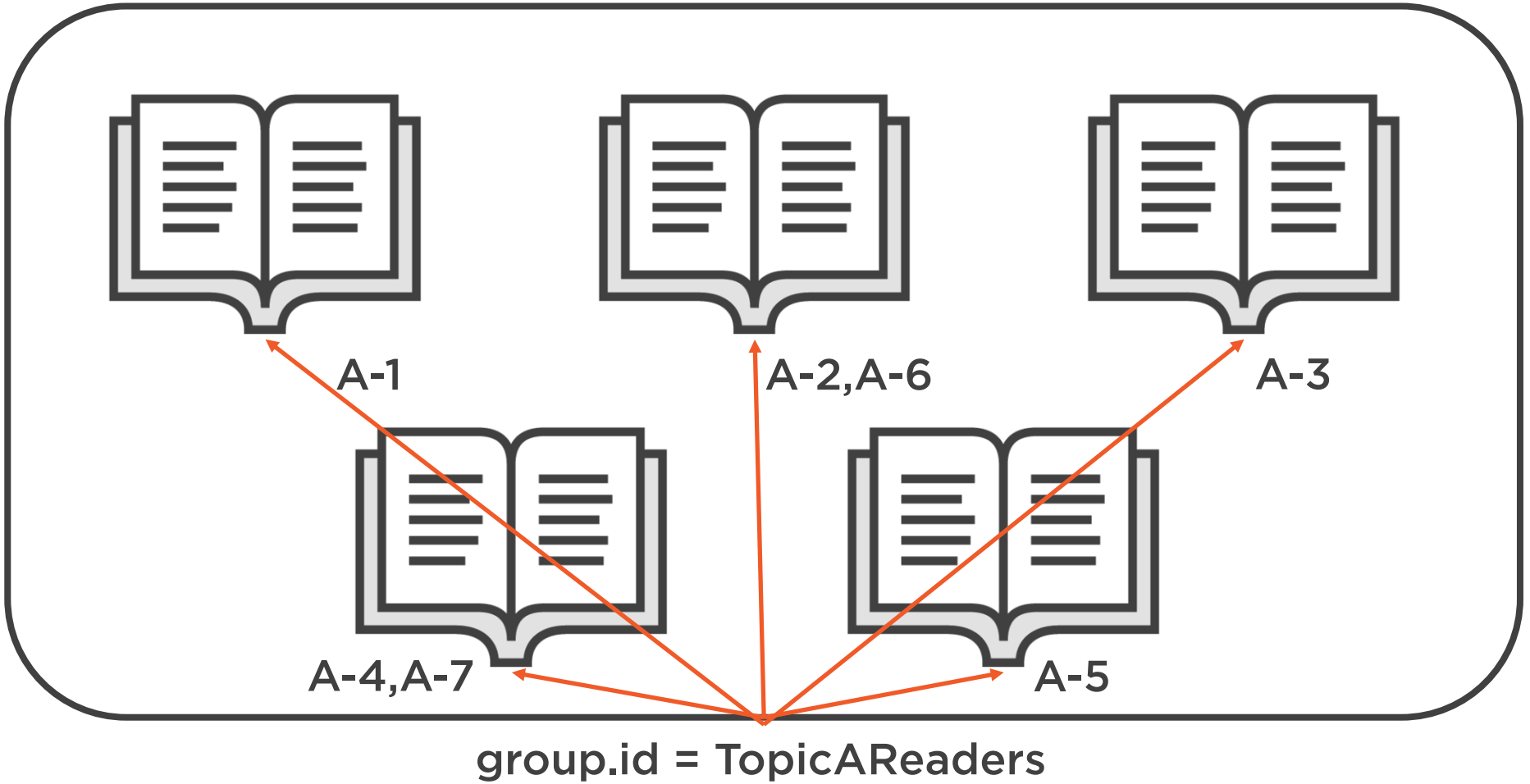



PRODUCERS
CONSUMERS

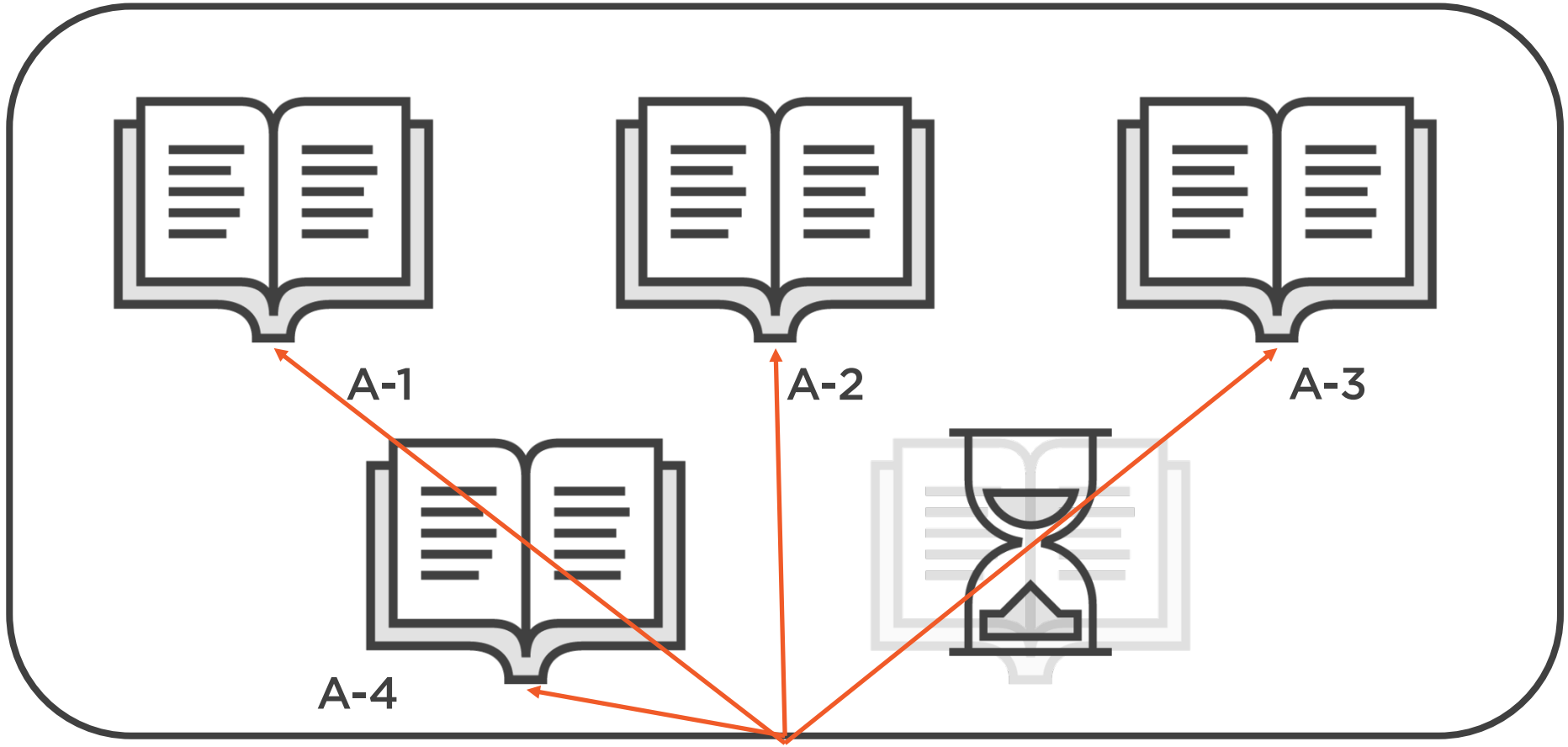
Consumers



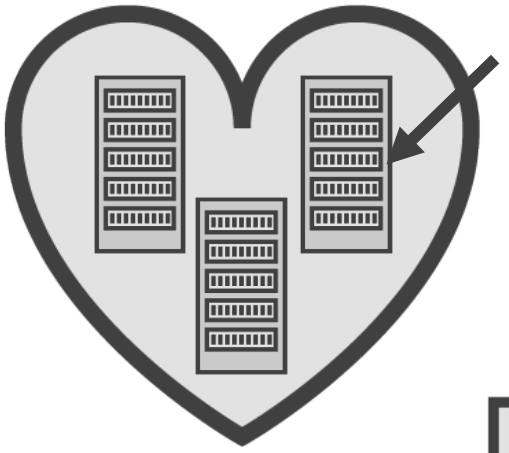
Consumer Groups



Consumer Groups



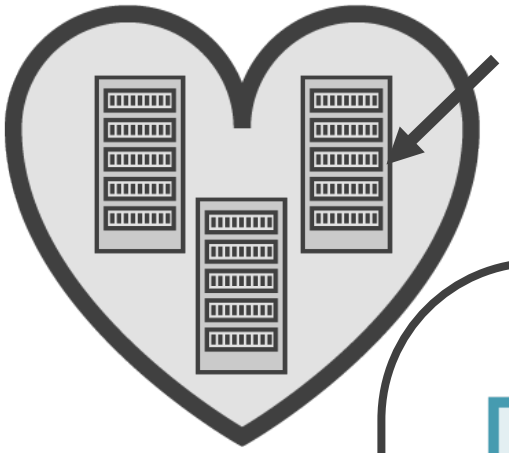
TopicA --partitions 4



Group Coordinator

Consumer Groups

group.id = TopicAReaders



Group Coordinator

Consumer Groups

LEADER

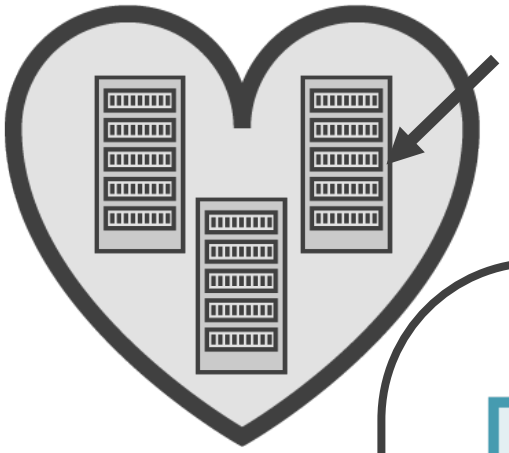
group.id = TopicAReaders
A-1

group.id = TopicAReaders
A-2

group.id = TopicAReaders
A-3

group.id = TopicAReaders
A-4

group.id = TopicAReaders
A-5



Group Coordinator

Consumer Groups

LEADER

group.id = TopicAReaders

A-1

group.id = TopicAReaders

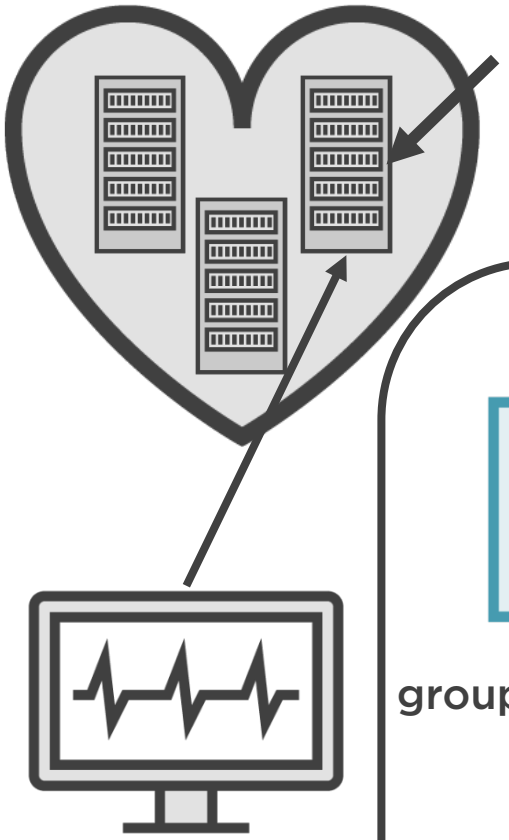
A-2

group.id = TopicAReaders

A-3

group.id = TopicAReaders

A-4



Group Coordinator

Consumer Groups

LEADER

group.id = TopicAReaders

A-1, A-5

group.id = TopicAReaders

A-2

group.id = TopicAReaders

A-3

group.id = TopicAReaders

A-4

Resources

- Apache Kafka Goes 1.0
  - https://www.confluent.io/blog/apache-kafka-goes-1-0/
- Quora on ZooKeeper
  - https://bit.ly/2MmyTPN
- Why Avro For Kafka Data
  - https://www.confluent.io/blog/avro-kafka-data/

Summary

Messaging for the Modern Era

Kafka Core Components

- Broker
- ZooKeeper
- Producer
- Consumer